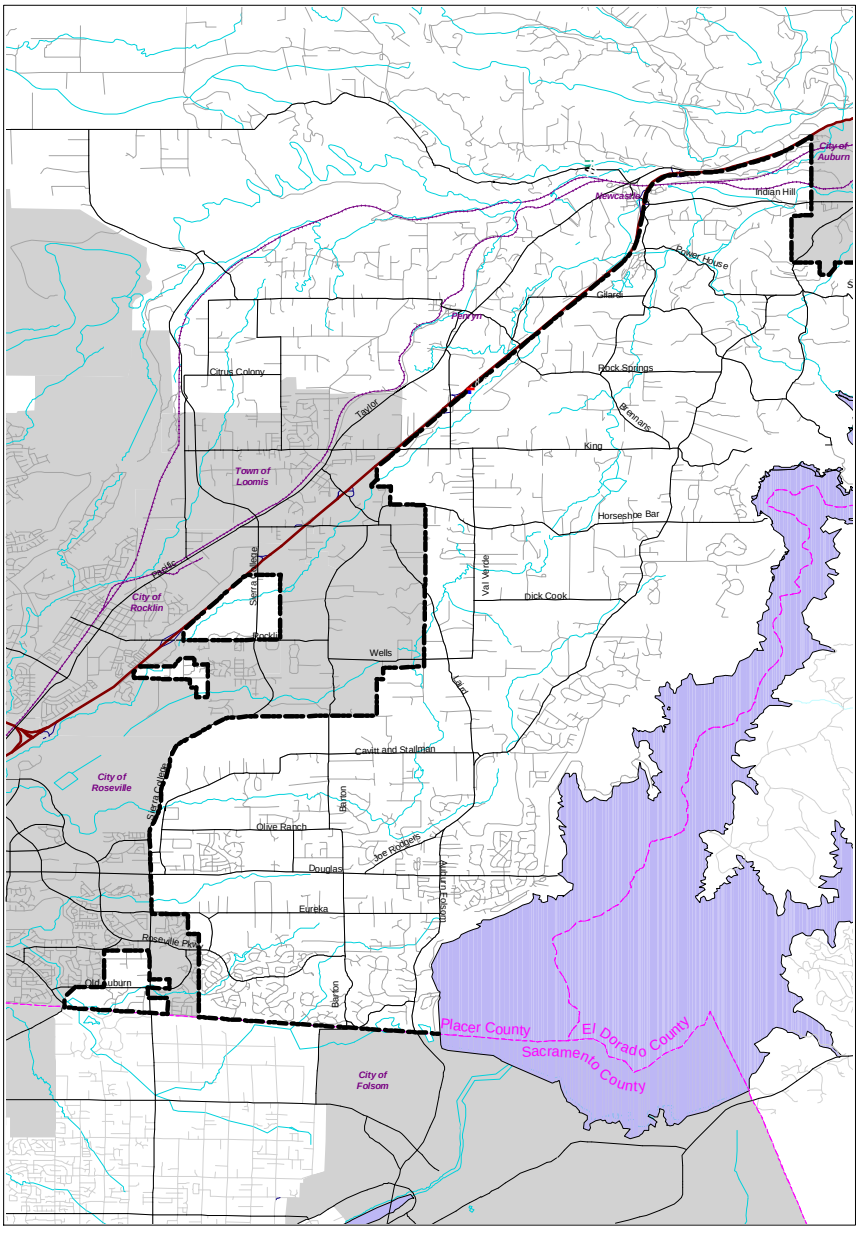
Southeast Placer County Transportation Study



Prepared for:
Placer County

by
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in association with
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Executive Summary

Study Purpose

The purpose of this study is to provide a technical analysis to support appropriate amendments to the Circulation Elements of Community Plans that govern the Southeast Placer County area. This will be done by:

1) Determining long-term transportation improvement needs for roadways, bicycles and pedestrians in the Southeast Placer County study area.

2) Determining appropriate standards for study area roadways and reviewing their compatibility with the standards of neighboring jurisdictions.

3) Gathering public input on transportation problems and potential solutions in the study area.

4) Defining a potential framework for a Neighborhood Traffic Management (NTM) Plan for Placer County and a "toolbox" of appropriate NTM measures for various problems.

5) Preparing a set of recommendations on transportation improvements and measures in the study area based on technical analysis and public input.

Problem Definition

Growth in Through Travel

While available land and low zoning densities will limit growth within the study area over the next 20 years, a tremendous amount of growth is expected in communities surrounding Southeast Placer County. Due to this growth, a large increase is expected in commuting between Western El Dorado County and the City of Folsom to the east of study area and the cities of Roseville and Rocklin to the west of the study area.

In 1995 just over half of the vehicles on Auburn-Folsom Road at the County line (about 9,000 out of 17,500 total daily vehicle trips) had one end of their trip within the study area (i.e. within Granite Bay or the Horseshoe Bar communities). The other 8,500 daily vehicle trips were "through traffic". By 2020, the amount of through traffic on that section of roadway is expected to grow by 17,300 daily vehicle trips, an increase of 190 percent. Local study area traffic using Auburn-Folsom Road at the County line is expected to increase by only about 2,100 daily vehicle trips over 1995 levels, or about 23 percent. Thus, much of the growth in traffic in Granite Bay will stem from through travel.

Increase in Traffic Congestion in Granite Bay

The anticipated increase in "through traffic" will result in increased levels of traffic congestion on the major roadways in Granite Bay, especially along Auburn-Folsom Road, Douglas Boulevard and Eureka Road. If improvements to key intersections are not made to these major roadways, then they will operate at level of service "F" conditions well before 2020. Placer County has level of service

policies in their General Plan as well as in the Granite Bay Community Plan and the Horseshoe Bar/Penryn Community Plan. These call for a LOS "C" standard on the roadways in this area.

Bikeways

Currently, the study area does not have an extensive or well-connected system of bike lanes. The study area is comprised primarily of a few disconnected Class II bike lanes and some Class I bike paths. Auburn-Folsom Boulevard is a popular north-south route for bicyclists, which serves regional travel between the Granite Bay area, northern Sacramento County and the City of Folsom to the Auburn area. The County has made considerable shoulder improvements along this heavily trafficked corridor to accommodate bicyclist's needs. However, circuitous residential street patterns in many of the communities in the study area make direct north-south travel along alternative routes to Auburn-Folsom Boulevard difficult. Many streets lack the proper signage needed to direct bicyclists along the bikeway routes through the County. Additionally, signage alerting motorists to cyclists and encouraging them to share the road is lacking. Many of the east-west routes are rural roadways with narrow shoulder widths, which may deter some cyclists.

While the Granite Bay and Horseshoe Bar/Penryn Community Plans contain policies, which state that regional bikeways should be located on or along collector or arterial roads, various roadways identified as collector or arterial roads either do not have any existing bikeway facilities or such facilities are not proposed in the plans.

Neighborhood Traffic Management

As a result of continued growth in Placer County, there is a greater potential for the quality of life in residential neighborhoods to be impacted by increased traffic volumes and speeding. Some neighborhoods in the County may already experience these problems and their detrimental effects on safety and livability. Left unmanaged, the County could find itself responding to these issues in an inefficient, case-by-case manner.

As part of the *Southeast Placer County Transportation Study*, DKS Associates has been asked to outline a potential framework for implementing Neighborhood Traffic Management (NTM). This section provides some options on how the County can address neighborhood traffic issues, not just in Southeast Placer County, but countywide, based on examples from other communities around the U.S.

Study Recommendations

The technical analyses conducted for this study led to the following set of recommendations related to roadways, bikeways and neighborhood traffic management.

Roadways

1) Work with PCTPA, SACOG and neighboring jurisdictions to address possible regional solutions to anticipated growth in "through traffic" to Granite Bay. This may include roadway, transit and/or travel demand management solutions.

2) Modify the level of service policies in the Granite Bay and Horseshoe Bar/Penryn Community Plans to allow exceptions to LOS C standard (i.e. allow LOS D or E where required improvements to achieve LOS C results in unacceptable impacts). Then plan for the following improvements:

   - Widen Auburn-Folsom Road to 4 lanes (with bike lanes) from Sacramento County line to just north of Douglas Boulevard.
   - Maintain 4 lanes on Douglas Boulevard between Auburn-Folsom Road and Cavitt-Stallman South Road but preserve right-of-way for 6 lanes as it may be needed in the long-range future.
   - Widen Douglas Boulevard to 6 lanes from Cavitt-Stallman South Road to Sierra College Boulevard (adjacent to the commercial development).
   - Maintain 2 lanes on Eureka Road but widen to provide shoulder/bike lanes and left turn lanes at key intersections plus preserve right-of-way for 4 lanes as it may be necessary in the long-range future.
   - Add turn lanes that would provide at least LOS D conditions in 2020 at major intersections including (but not limited to) the following:
     - Douglas/Cavitt-Stallman
     - Douglas/Barton
     - Douglas/Auburn-Folsom
     - Eureka/Barton
     - Eureka/Auburn-Folsom
   - Recognize that the intersection of Douglas Blvd and Sierra College Blvd currently operates at LOS F conditions during the peak hour. Implement the maximum feasible at-grade improvements at this intersection (i.e. 2 left turn lanes, 3 through lanes and a separate right-turn lane on all approaches), which may still result in LOS F conditions during the peak hour in 2020. Study other potential solutions to relieve this anticipated congestion.
   - Explore appropriate traffic management measures for arterial roadways to reduce speeds and limit increases in traffic volumes along Eureka Road.
   - Monitor traffic volumes on Eureka Road and Douglas Boulevard and if additional roadway widen is necessary to maintain at least LOS E conditions, the widening of Douglas Boulevard to six lanes should be considered before a widening of Eureka Road to four lanes.

3) Potentially close some median openings along Douglas Boulevard at minor roadways and/or driveways and only allow right-turns due to safety concerns related to high volumes on Douglas Boulevard.

4) Eliminate Rocklin Road Extension from General Plan Circulation Element and Community Plan and provide selected improvements (shoulders and intersection turn lanes) to alternative routes. Also provide a new connection between Laird Road and Val Verdi Road.

5) Explore revised roadway cross-section (lane and shoulder width) standards for 2-lane arterial/collector roadways based on average speed and projected roadway volume. .

6) Set roadway width standard for local urban/suburban roadways to 28 - 32 feet of pavement (with width depending on traffic volume and parking demand) plus curb, gutter and sidewalks.

7) Provide urban roadway standard (with curb, gutter and sidewalk) on urban streets that are shared with other jurisdictions (such as Greenbrae Road and Aguilar Road).

8) Update the Capital Improvement Program and traffic impact fees for the study area.

Bikeways

1) Change the proposed Class III bikeway on Eureka Road from Barton Road to Auburn-Folsom to proposed Class II bikeway.

2) Link the proposed Class III bikeway on Laird Road from Wells Avenue north to the proposed Class II bikeway in Loomis with a Class III or II bikeway.

3) Provide Class III or Class II bicycle access on Elmhurst Drive.

4) Provide a link to the proposed Class I path along Linda Creek east of Sierra College Boulevard, which is being considered as part of a proposed development in eastern Roseville and is proposed to extend into Placer County.

Neighborhood Traffic Management

1) Establish a comprehensive NTM Program for Placer County that includes NTM policies and a process and criteria for defining problems, selecting appropriate solutions, prioritizing and funding measures, and monitoring benefits/costs.

2) Based on technical analysis for two NTM "case studies" on Elmhurst Drive and Eureka Road, define and implement some phased solutions to traffic speed and volumes issues along these roadways.

3) Explore revised/narrower roadway cross-section standards for residential roadways based on the functional classification of the roadway and residential densities.

1. Introduction

Study Background

The study area for the Southeast Placer County Transportation Study, shown in Figure 1, covers the unincorporated areas of Placer County that are south of the City of Auburn and southeast of Interstate 80. This area covers the Granite Bay Community Plan Area, and portions of the Horseshoe Bar/Penryn and Newcastle/Ophir Community Plan areas.

Placer County recognizes that traffic demand is growing in the study area and that much of that increase in traffic volume will be due to development outside of the study area.

Study Purpose

The purpose of this study is to provide a technical analysis to support appropriate amendments to the Circulation Elements of Community Plans that govern the Southeast Placer County area. This will be done by:

1) Determining long-term transportation improvement needs for roadways, bicycles and pedestrians in the Southeast Placer County study area.

2) Determine appropriate standards for study area roadways and reviewing their compatibility with the standards of neighboring jurisdictions.

3) Gathering public input on transportation problems and potential solutions in the study area.

4) Defining a framework for a Neighborhood Traffic Management (NTM) Plan for Placer County and a "toolbox" of appropriate NTM measures for various problems.

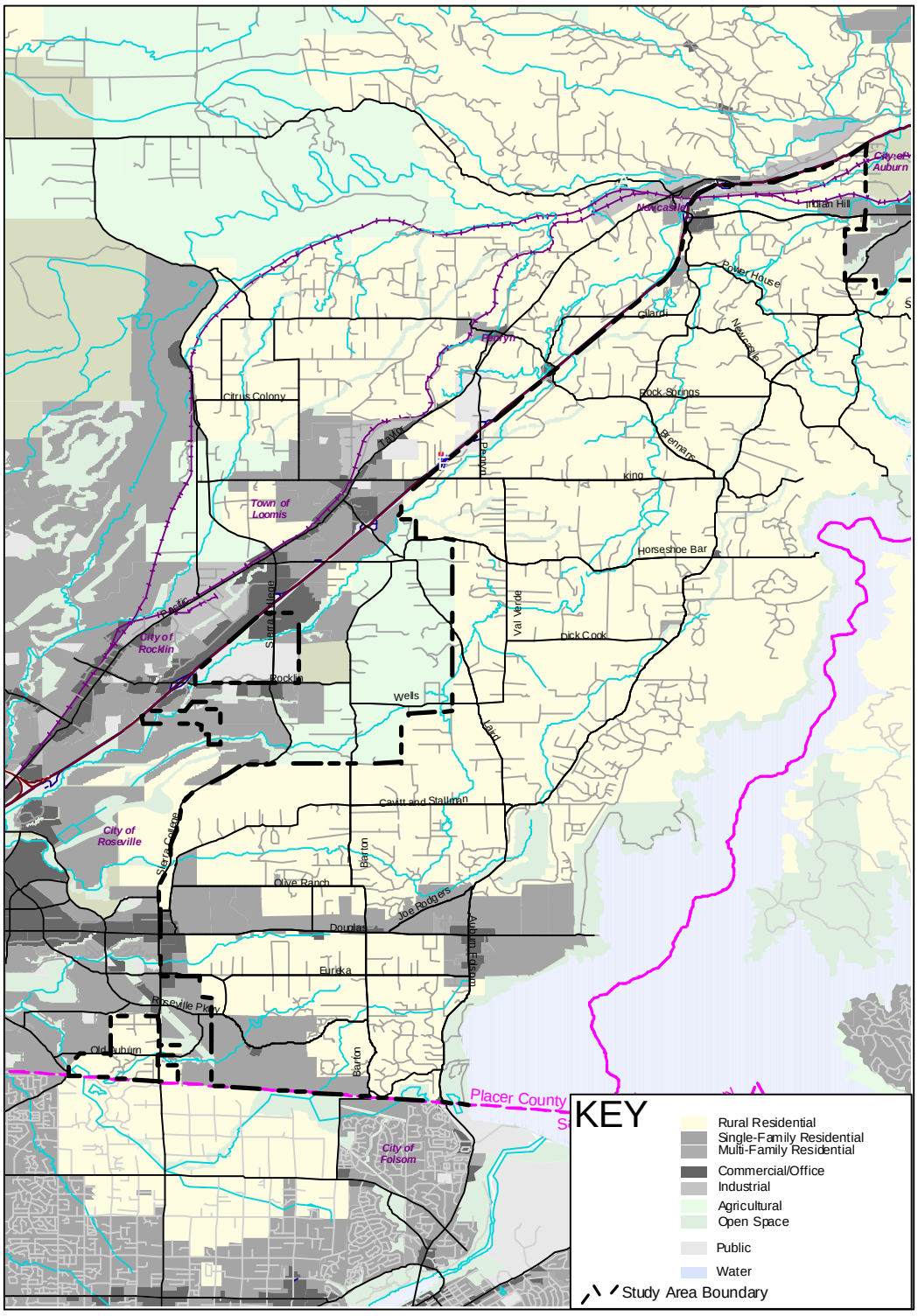
5) Preparing a set of recommendations on transportation improvements and measures in the study area based on technical analysis and public input.

2. Problem Definition

Regional and Study Area Growth

This study is evaluating the long-term (20-year) transportation needs in Southeast Placer County. Traffic forecasts were prepared for the year 2020 using the Placer County Travel Demand Model. The model translates growth in residential development (represented by an estimate of single-family and multi-family housing units) and non-residential development

Figure 1: Study Area Boundary and Planned Land Uses



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(represented by estimates of the square footage by development type, plus the number of enrolled students) into projections of traffic on arterial and collector roadways throughout Placer County. The County's travel demand model covers Placer, Sacramento, El Dorado and Yolo counties as well as South Sutter County. Thus, the model captures the impacts of regional growth on traffic demand in the Southeast Placer County study area.

Estimates of the growth in residential and non-residential development between 1999 and 2020 in Placer County are based on existing general plan land use densities and the best estimates of market absorption from each local jurisdiction. Figure 1 shows the designated land uses within the study area. Estimates of 2020 development outside of Placer County are based on projections prepared by the Sacramento Area Council of Governments (SACOG).

Table 1 and Figure 2 show the estimated growth in the Southeast Placer County study area as well as surrounding communities. As shown on Figure 1, much of the study area is zoned for rural residential/low density uses and is already close to "buildout". Residential uses in the study area will reach buildout levels before 2020 with an increase in population of about 9,500, which represents a 40 percent increase over 1999 levels. Non-residential land in the study area is limited to a few areas, primarily near Sierra College Boulevard and Auburn-Folsom Road intersections with Douglas Boulevard. Employment within the study area is expected to increase by 1,400 between 1999 and 2020, an increase of about 46 percent.

While available land and low zoning densities will limit growth within the study area over the next 20 years, a tremendous amount of growth is expected in communities surrounding Southeast Placer County. As shown in Table 1, an additional 42,000 and 31,000 people are expected to be living in the cities of Roseville and Rocklin respectively by 2020. The combined population of 177,000 for those two cities represents a 70 percent increase over 1999 levels. Western El Dorado County and Folsom are expected to add 56,000 and 28,000 residents over the next 20 years, respectively.

Employment in Roseville and Rocklin is expected to increase even faster than their population, with an estimated 77,000 jobs added by 2020. The number of jobs in Western El Dorado County and Folsom is expected to nearly double by 2020.

The large amount of growth that is expected in communities east and west of the study area will result in a large increase in commuting through Granite Bay. The lack of job growth in Western El Dorado County, coupled with their anticipated growth in population, will exasperate this problem.

Growth in Through Travel

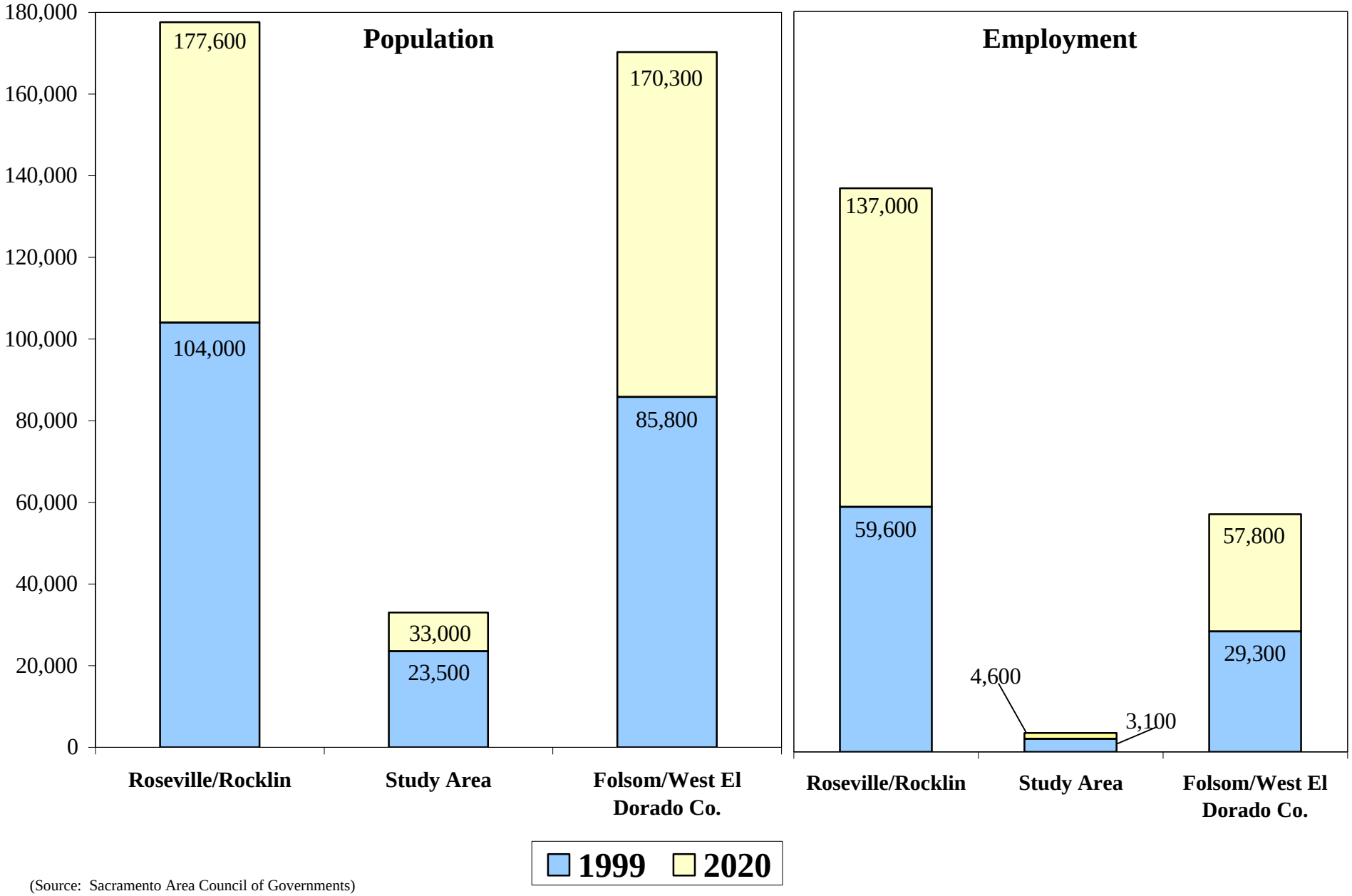
The Placer County travel demand model was used to estimate the amount of "through traffic" (trips that have neither their origin nor destination within the study area) that uses study area roadways. Figure 3 shows the expected growth in through traffic on Auburn-Folsom Road at the Placer County/Sacramento County Line. This graphic shows the model's estimate of the origins/destinations of traffic on that section of roadway in 1995 and 2020. It indicates that in 1995 just over half of the vehicles on Auburn-Folsom Road at the County line (about 9,000 out of 17,500 daily vehicle trips) had one end of their trip within the study area (i.e. within Granite Bay or the Horseshoe Bar communities). The other 8,500 daily vehicle trips were "through traffic". By 2020, the amount of

Table 1
Projected Population and Employment Growth 1999-2020

Community	Population				Employment			
			Growth				Growth	
	1999	2020	Number	Percent	1999	2020	Number	Percent
Granite Bay Community Plan Area	16,229	22,505	6,276	38.7%	2,604	3,698	1,094	42.0%
Horseshoe Bar Area	7,286	10,510	3,224	44.2%	535	890	355	66.4%
Subtotal Study Area	**23,515**	**33,015**	**9,500**	**40.4%**	**3,139**	**4,588**	**1,449**	**46.2%**
City of Folsom	41,109	69,164	28,055	68.2%	19,219	31,537	12,318	64.1%
El Dorado Hills	18,454	64,740	46,286	250.8%	5,517	17,539	12,022	217.9%
Cameron Park	26,260	36,353	10,093	38.4%	4,568	8,724	4,156	91.0%
Subtotal Folsom/West El Dorado	**85,823**	**170,257**	**84,434**	**98.4%**	**29,304**	**57,800**	**28,496**	**97.2%**
City of Roseville	72,273	114,731	42,458	58.7%	47,804	107,219	59,415	124.3%
City of Rocklin	31,741	62,844	31,103	98.0%	11,777	29,826	18,049	153.3%
Subtotal Roseville/Rocklin	**104,014**	**177,575**	**73,561**	**70.7%**	**59,581**	**137,045**	**77,464**	**130.0%**

Source: Sacramento Area Council of Governments, 1999

Projected Population and Employment Growth
1999-2020



(Source: Sacramento Area Council of Governments)

"through traffic" on that section of roadway is expected to grow by 17,300 daily vehicle trips, an increase of 190 percent. Local study area traffic using Auburn-Folsom Road at the County line is expected to increase by only about 2,100 daily vehicle trips over 1995 levels, or about 23 percent.

Evaluation of Base 2020 Roadway Network

The evaluation of future traffic demand and congestion levels involved the preparation of traffic forecasts on a "base 2020 roadway network", which included the following roadway improvements:

- The widening of Sierra College Boulevard to 6 lanes from the Sacramento County line to Olympus Drive to 4 lanes from Olympus Drive to the Rocklin south city limits, and to 6 lanes from the Rocklin south city limits to I-80.
- The widening of Auburn-Folsom Road to 4 lanes from the Sacramento County line to north of Douglas Boulevard.

Figure 4 shows the 1995 and projected 2020 daily traffic volumes on the major roadways in the study area assuming the "base 2020 roadway network".

Placer County has level of service policies in their General Plan as well as in the Granite Bay Community Plan and the Horseshoe Bar/Penryn Community Plan. These call for a LOS "C" standard on the roadways in this area. Level of service is like a report card for a roadway – "A" is good and "F" is bad. The capacity and level of service on the study area roadway system will be controlled by the capacity of the major intersections in the study area.

A level of service analysis of study area roadways indicates that there would be significant congestion along Douglas Boulevard and Eureka Road in 2020 if only those roadway improvements included in the "Base 2020 roadway network" were implemented. The analysis also concludes that there would not be significant traffic congestion issues on study area roadways north of Douglas Boulevard.

Figure 3: Projected Growth in Through Traffic on Auburn-Folsom Road

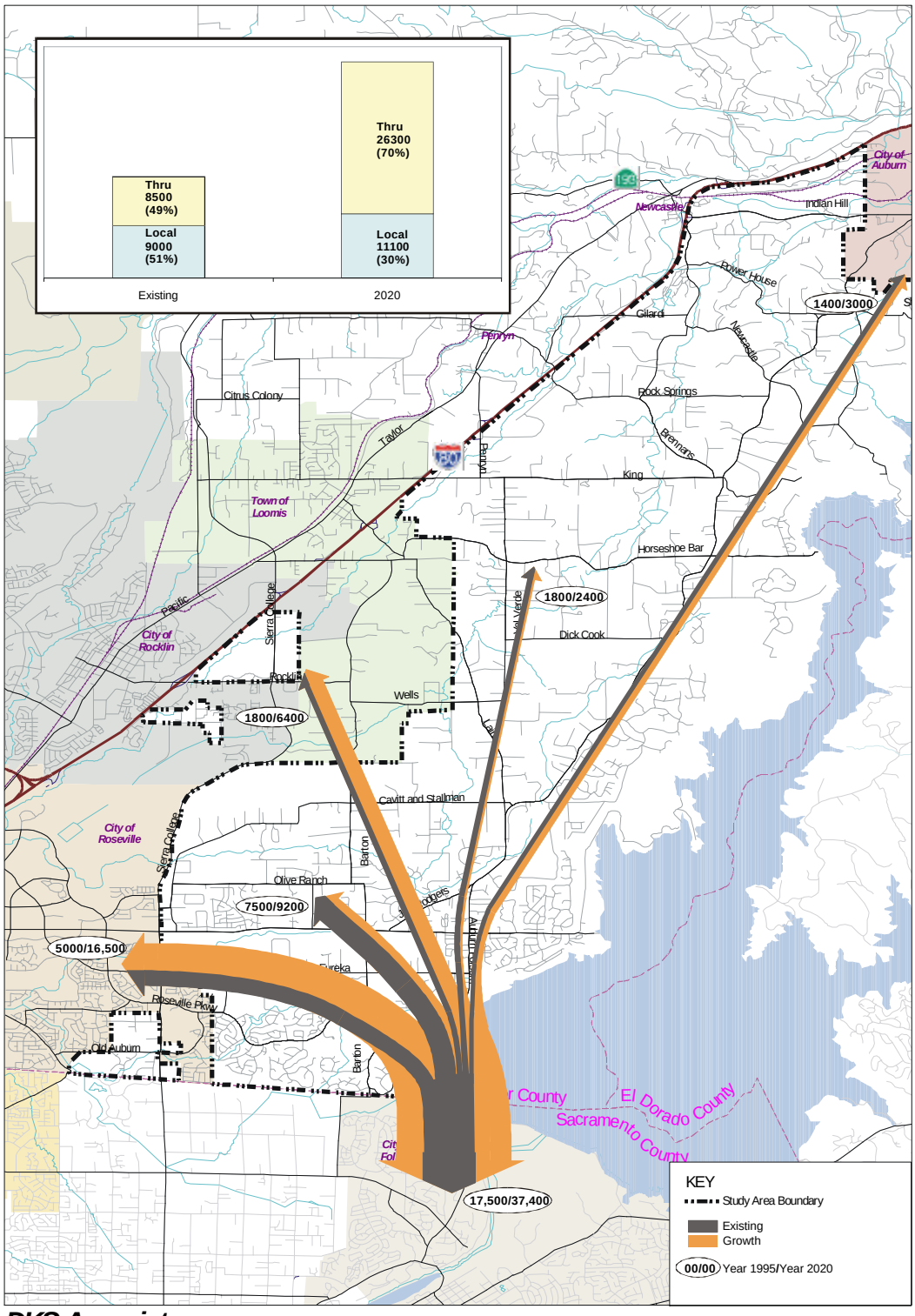


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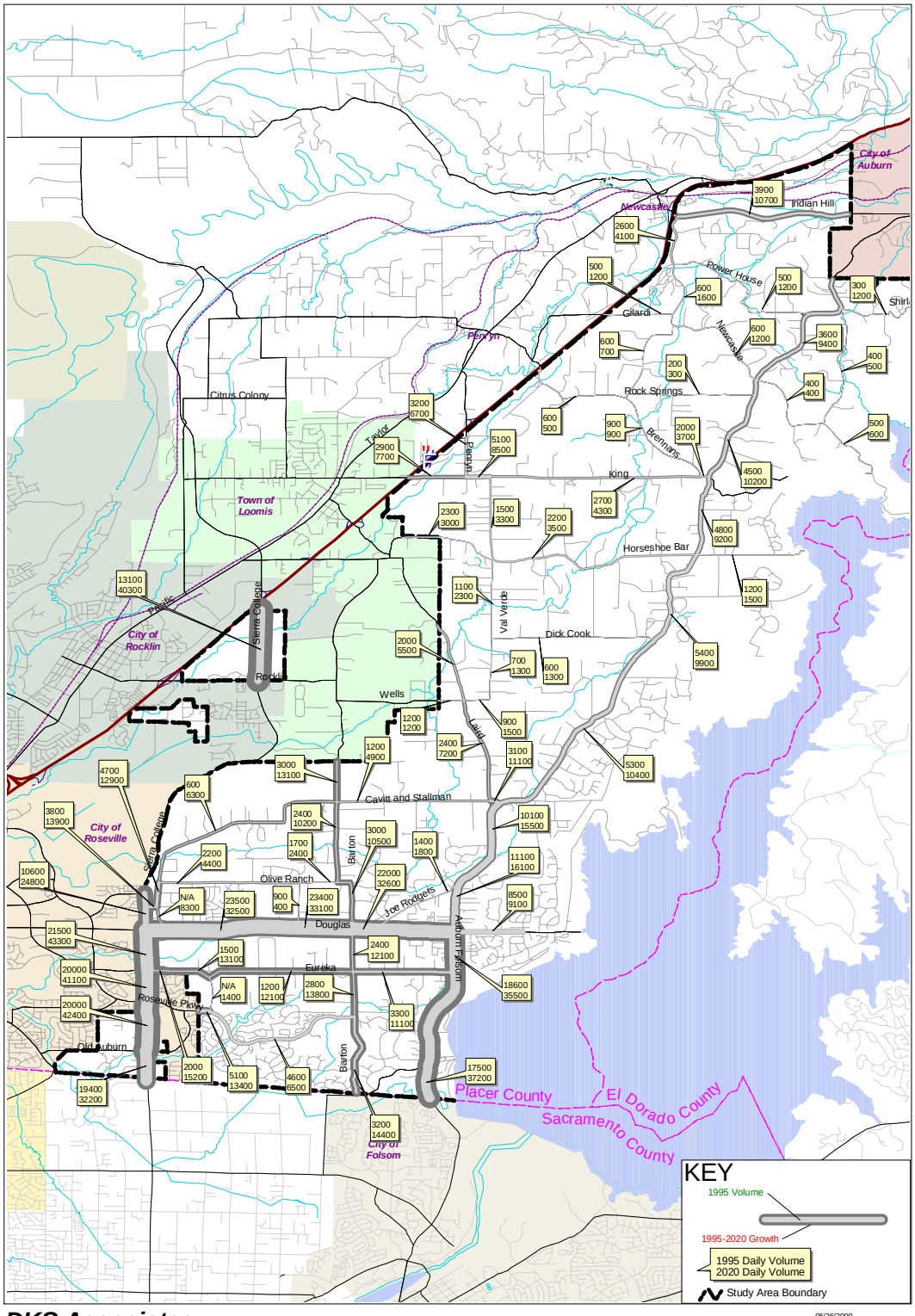
Figure 4: Projected Growth in Daily Traffic Volumes on Study Area Roadways



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3. Alternative Roadway Improvement Scenarios

Description of Granite Bay Alternatives

To mitigate the anticipated traffic congestion levels on roadways in Granite Bay, DKS worked with the Placer County staff to define several roadway improvement scenarios for testing purposes. Four alternatives were identified, which focused on improvements to Douglas Boulevard and Eureka Road. These alternatives, all of which include some level of improvement at major intersections along Douglas Boulevard and Eureka Road, are shown in Table 2 and can be described as follows:

- Alternative 1 would maintain the current number of travel lanes on Douglas Boulevard (4 lanes) and Eureka Road (2 lanes) as exists today. This alternative assumes that planned shoulder/bike lanes would be added to Eureka Road. This alternative is consistent with the Granite Bay Community Plan.

- Alternative 2 would involve widening Douglas Boulevard to 6 lanes from Auburn-Folsom Road to Sierra College Boulevard and maintaining the current number of travel lanes on Eureka Road (2 lanes) as exists today. This alternative assumes that planned shoulder/bike lanes would be added to Eureka Road.

- Alternative 3 would involve widening Eureka Road to 4 lanes plus shoulder/bike lanes from Auburn-Folsom Road to Wellington and maintaining the current number of travel lanes on Douglas Boulevard (4 lanes) as exists today.

- Alternative 4 would involve widening Douglas Boulevard to 6 lanes from Auburn-Folsom Road to Sierra College Boulevard and widening Eureka Road to 4 lanes plus shoulder/bike lanes from Auburn-Folsom Road to Wellington.

By evaluating these four alternatives, Placer County intended to learn about the changes in traffic demand on study area roadways and how each alternative would impact future traffic congestion levels.

Table 2
Alternative Roadway Improvement Scenarios

Alternative	Number of Travel Lanes	
	Douglas Boulevard	Eureka Road
1	4	2
2	6	2
3	4	4
4	6	4

Note: Alternative 1 is consistent with the Granite Bay Community Plan.

Evaluation of Alternatives for Granite Bay

The capacity and level of service on the study area roadway system will be controlled by the capacity of the major intersections in the study area. For each of the four roadway improvement schemes, DKS defined three levels of intersection improvements:

- **Base Intersection Improvements** – which represent either existing conditions or existing conditions plus the addition of the through traffic lanes assumed under each alternative.
- **Minimum Intersection Improvements** – involving the addition of some turn lanes at intersections that would at least provide LOS "D" or "E" conditions in 2020.
- **Maximum Intersection Improvements** – involving the addition of intersection improvements that attempt to provide LOS "C" conditions in 2020.

It was recognized that the intersection of Douglas Blvd and Sierra College Blvd currently operates at LOS F conditions during the peak hour and that improvements to provide LOS "E" conditions at this intersection in 2020 will be difficult. Improvements to this intersection must be done in cooperation with the City of Roseville since they have jurisdiction over the western side of this intersection. For the purpose of this study, it was assumed that Placer County and Roseville would implement the "maximum feasible at-grade improvements" at this intersection (i.e. 2 left-turn lanes, 3 through lanes and a separate right-turn lane on all approaches). It was recognized that these improvements might still result in LOS F conditions during the peak hour in 2020. The congestion problems at this intersection stem from regional traffic demand and thus will require regional solutions. It is recommended that Placer County work with Roseville and the Placer County Transportation Planning Agency (PCTPA) to study other potential solutions to relieve this anticipated congestion.

Figures 5 through 8 show the projected daily traffic volumes on roadways in Granite Bay under each of the four roadway improvement scenarios. These figures also show the number of lanes at each intersection under the base, minimum and maximum improvement schemes, plus the resulting peak hour level of service in 2020. Table 3 summarizes the projected daily traffic volumes, while Table 4 summarizes the peak hour levels of service under each alternative. The key conclusions from this evaluation are:

- The widening of Douglas Boulevard and/or Eureka Road would attract additional traffic through this "corridor" by reducing congestion and improving travel speeds. Thus, Alternative 1 (no widening except at major intersections) would result in the lowest combined traffic volume while Alternative 4 (widening of both Douglas Boulevard and Eureka Road) would have the highest combined volume.
- Without any intersection improvements, most of the major intersection along Douglas Boulevard and Eureka Road would operate at LOS "E" or "F" conditions under all four alternatives.
- The intersection of Douglas Boulevard and Sierra College Boulevard would operate at LOS "F" conditions under all of the alternatives assuming the "maximum feasible at-grade improvements".

Figure 5

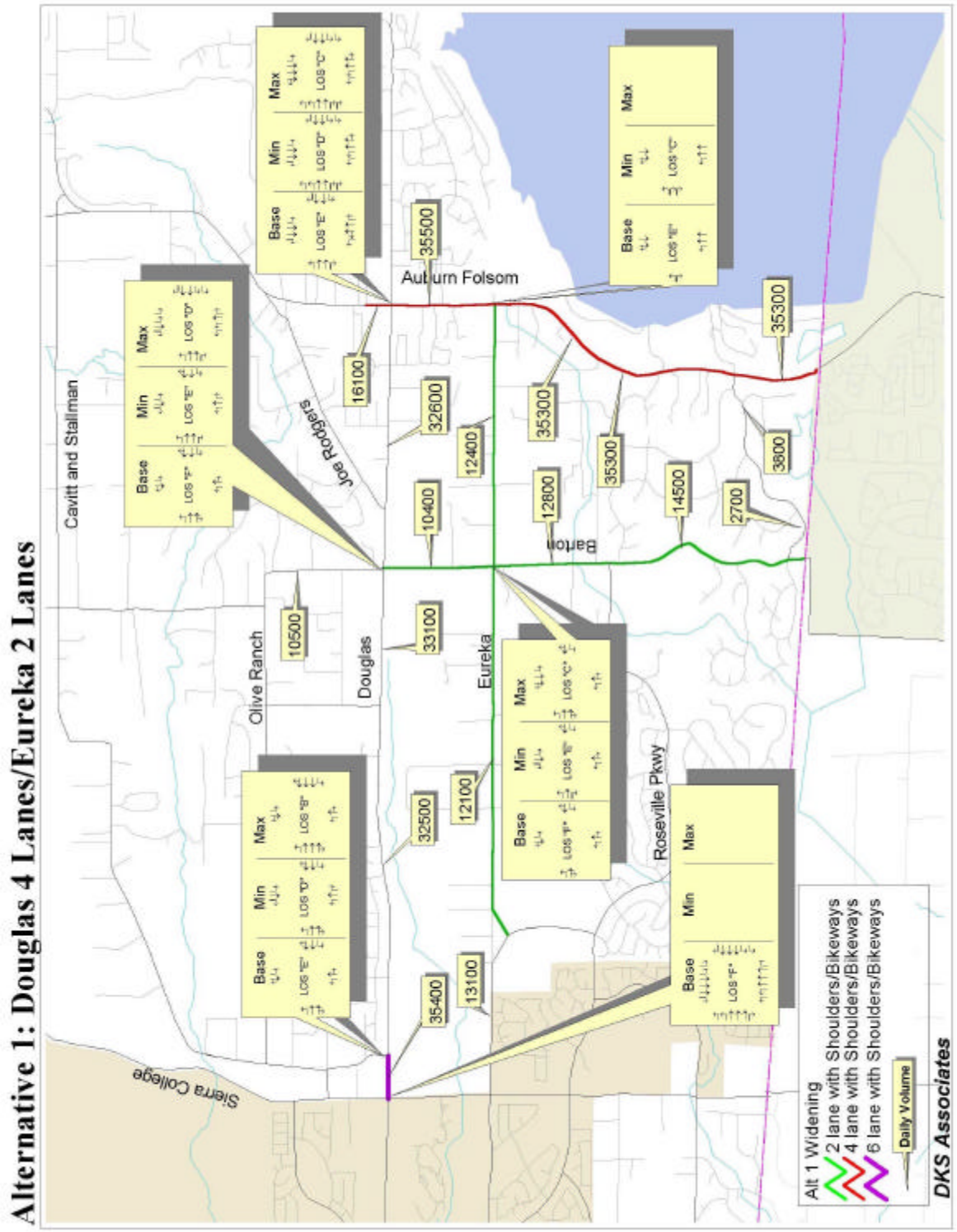
Alternative 1: Douglas 4 Lanes/Eureka 2 Lanes
Auburn Folsom
Cavitt and Stallman
Joe Rodgers
Olive Ranch
Douglas
Eureka
Barton
Roseville Pkwy
Sierra College
35500
16100
32600
12400
35300
35300
35300
3800
10400
12800
14500
2700
10500
33100
32500
12100
35400
13100
Base
Min
Max
Alt 1 Widening
2 lane with Shoulders/Bikeways
4 lane with Shoulders/Bikeways
6 lane with Shoulders/Bikeways
Daily Volume
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Figure 6

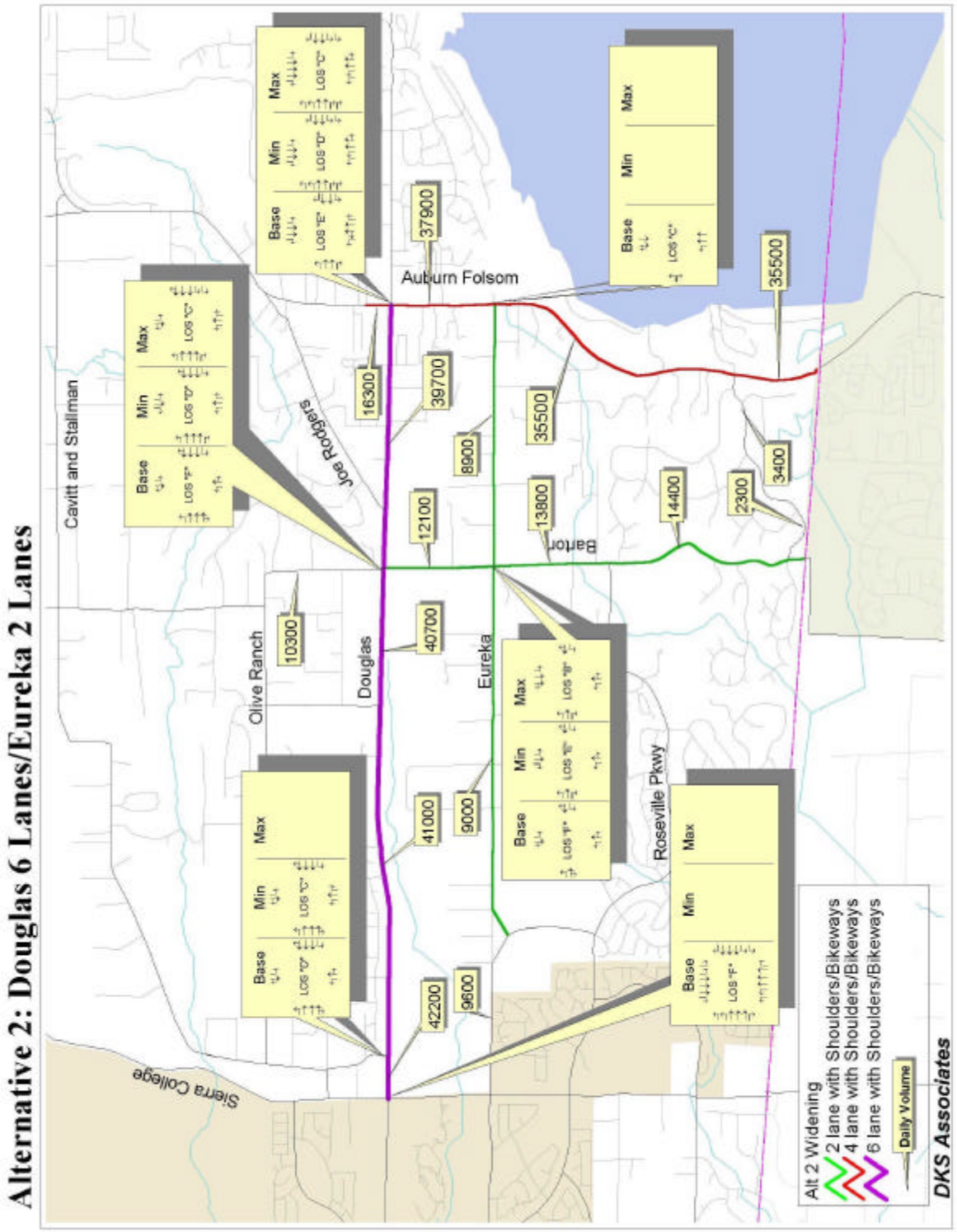
Alternative 2: Douglas 6 Lanes/Eureka 2 Lanes
Auburn Folsom
Cavitt and Stallman
Joe Rodgers
Olive Ranch
Douglas
Eureka
Barton
Roseville Pkwy
Sierra College
Base
Min
Max
37900
35500
16300
39700
8900
12100
13800
14400
2300
3400
10300
40700
41000
9000
42200
9600
Alt 2 Widening
2 lane with Shoulders/Bikeways
4 lane with Shoulders/Bikeways
6 lane with Shoulders/Bikeways
Daily Volume
DKS Associates

Figure 7

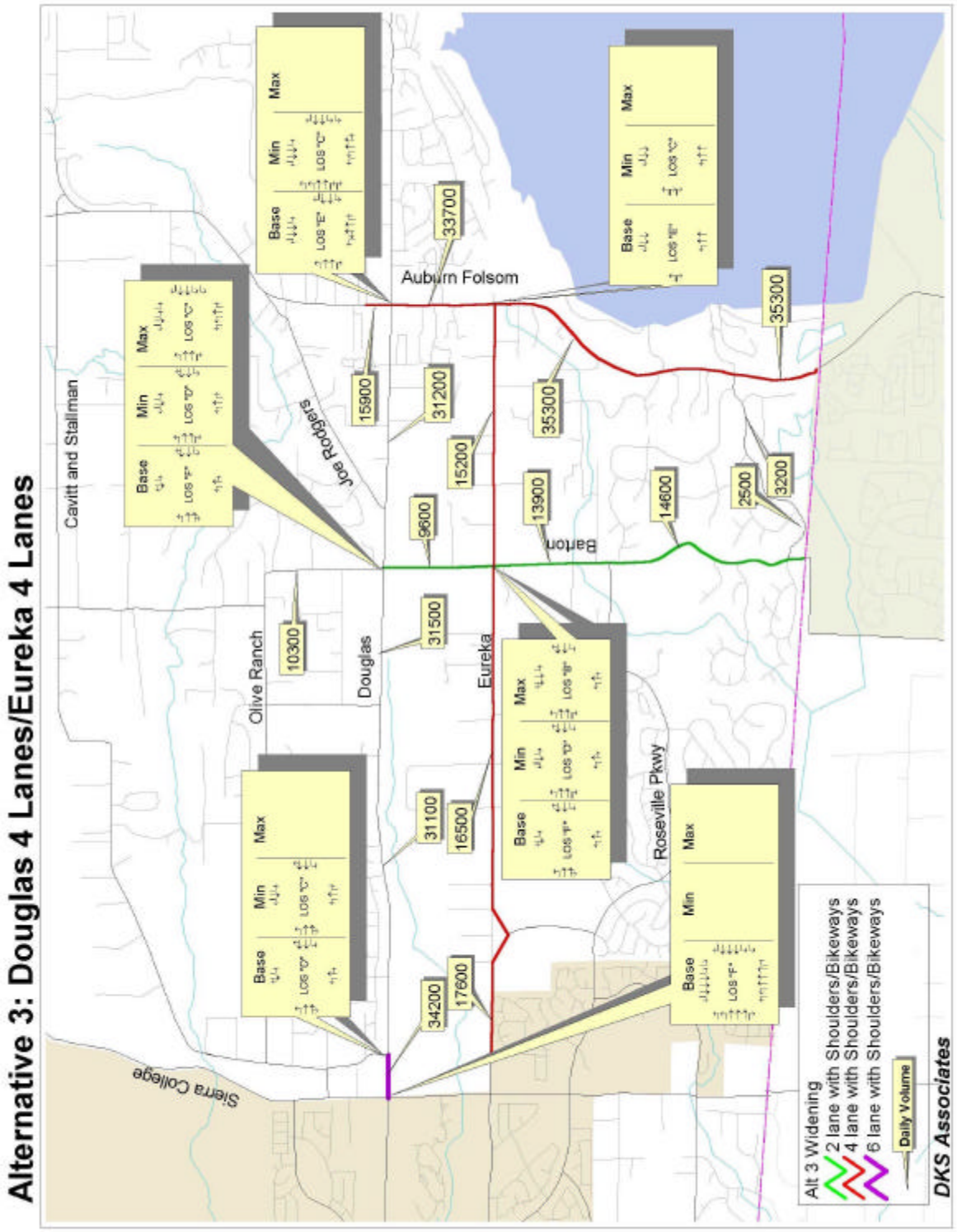
Alternative 3: Douglas 4 Lanes/Eureka 4 Lanes
Cavitt and Stallman
Joe Rodgers
Olive Ranch
Douglas
Eureka
Auburn Folsom
Barton
Roseville Pkwy
Sierra College
33700
15900
31200
15200
9600
13900
35300
35300
14600
2500
3200
10300
31500
31100
16500
34200
17600
Base
Min
Max
Alt 3 Widening
2 lane with Shoulders/Bikeways
4 lane with Shoulders/Bikeways
6 lane with Shoulders/Bikeways
Daily Volume
DKS Associates

Figure 8

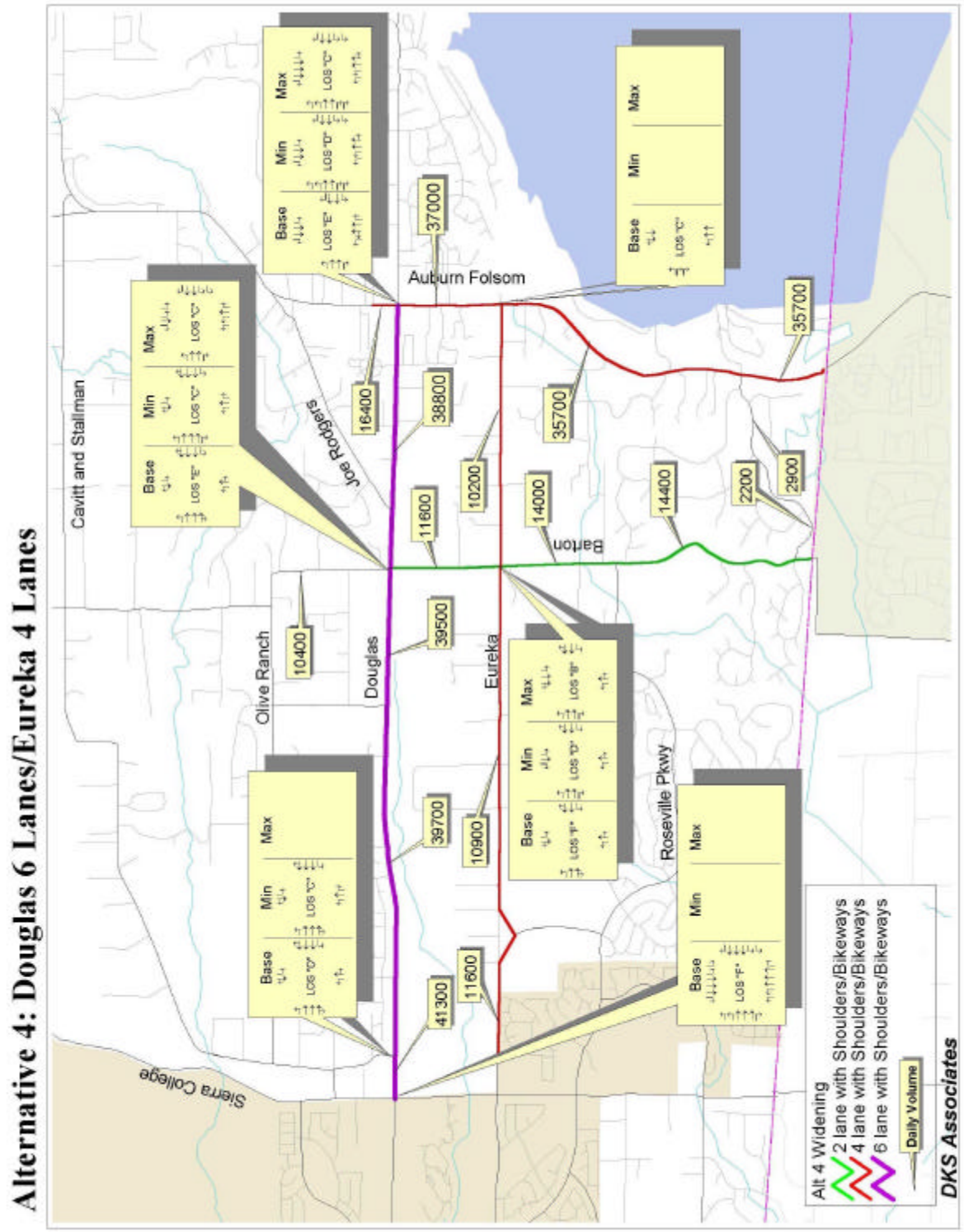
Alternative 4: Douglas 6 Lanes/Eureka 4 Lanes
Cavitt and Stallman
Joe Rodgers
Auburn Folsom
Olive Ranch
Douglas
Eureka
Barton
Roseville Pkwy
Sierra College
Base
Min
Max
37000
35700
16400
38800
10200
11600
14000
14400
2200
2900
10400
39500
39700
10900
41300
11600
Alt 4 Widening
2 lane with Shoulders/Bikeways
4 lane with Shoulders/Bikeways
6 lane with Shoulders/Bikeways
Daily Volume
DKS Associates

Table 3
2020 Daily Traffic Volumes
Alternative Roadway Improvement Scenarios

Alternative	Douglas Boulevard			Eureka Road			Combined 2020 Daily Volume on Douglas and Eureka West of Barton
	Lanes	2020 Daily Traffic Volume		Lanes	2020 Daily Traffic Volume		
		West of Barton	East of Barton		West of Barton	East of Barton	
1	4	32,500	32,600	2	12,100	12,400	44,600
2	6	41,000	39,700	2	9,000	8,900	50,000
3	4	31,100	31,200	4	16,500	15,200	47,600
4	6	39,700	38,800	4	10,900	10,200	50,600

Table 4
2020 Peak Hour Levels of Service

Intersection	Alternative	Intersection Improvement Scheme		
		Base	Minimum	Maximum
Douglas and Sierra College	1	**F**	**F**	**F**
	2	**F**	**F**	**F**
	3	**F**	**F**	**F**
	4	**F**	**F**	**F**
Douglas and Cavitt-Stallman	1	**E**	**D**	B
	2	**D**	C	C
	3	**D**	C	C
	4	**D**	C	C
Douglas and Barton	1	**F**	**E**	**D**
	2	**F**	**D**	C
	3	**F**	**D**	C
	4	**E**	C	C
Douglas and Auburn-Folsom	1	**E**	**D**	C
	2	**E**	**D**	C
	3	**E**	C	C
	4	**E**	**D**	C
Eureka and Barton	1	**F**	**E**	C
	2	**F**	**E**	B
	3	**F**	**D**	B
	4	**F**	**D**	B
Eureka and Auburn-Folsom	1	**E**	C	C
	2	C	C	C
	3	C	C	C
	4	C	C	C

- Alternative 1 (no widening of Douglas or Eureka) with "minimum" intersection improvements would provide at least LOS "E" conditions except at the intersection of Douglas Boulevard and Sierra College Boulevard.
- Alternative 1 (no widening of Douglas or Eureka) with "maximum" intersection improvements would provide at least LOS "C" conditions except at the Douglas Boulevard/Barton Road (LOS "D") and Douglas Boulevard/Sierra College Boulevard (LOS "F") intersections.

Evaluation of Alternatives for Rocklin Road Extension

The Circulation Elements of the Placer County General Plan and the Granite Bay Community Plan include the extension of Rocklin Road from Barton Road to Auburn-Folsom Road. When these plans were prepared, it was felt that this roadway extension would be needed to provide alternative east-west access through the Granite Bay area and potentially relieve congestion on other roadways. As part of this transportation study, DKS has evaluated two alternatives for meeting the objectives of this roadway extension. These involve the Rocklin Road Extension as shown in the Granite Bay Circulation Element and a "functional equivalent" to this extension that relies on existing roadways (with shoulder widening and spot improvements) and a planned roadway between Barton Road and Laird Road.

The analysis of the "Base 2020 roadway network" discussed previously concluded that there would not be significant traffic congestion issues on study area roadways north of Douglas Boulevard. Figures 9 and 10 show the projected daily traffic volumes in 2020 with the Rocklin Road Extension and with "functional equivalent" to this extension, respectively. These figures indicate that while the Rocklin Road extension would reduce traffic volumes on some east-west roadways near this extension, such as Wells Road and Horseshoe Bar Road, it would also increase volumes somewhat on Rocklin Road west of Barton Road. More importantly, the extension of Rocklin Road would not have a significant impact on reducing traffic congestion on roadways in Granite Bay.

The Rocklin Road Extension would be a costly improvement. Since it would have a limited impact on reducing volumes on congested roadways, it does not appear to be a cost-effective solution. Therefore, it is recommended that this extension be eliminated from the General Plan Circulation Element and Community Plan and replaced with selected improvements (shoulders and intersection turn lanes) to alternative routes that would provide a "functional equivalent" to this extension.

Figure 9: Planned Rocklin Road Extension

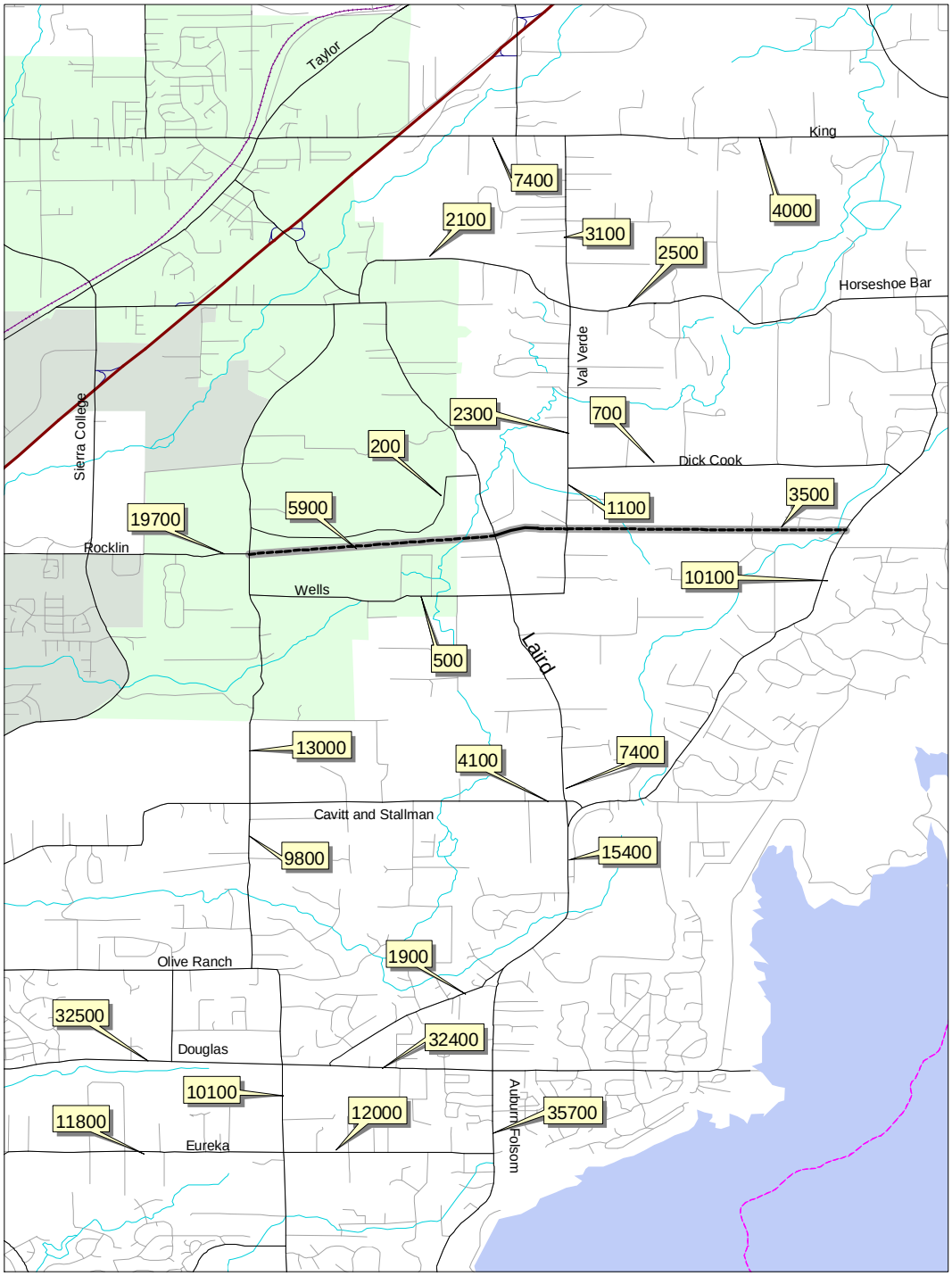

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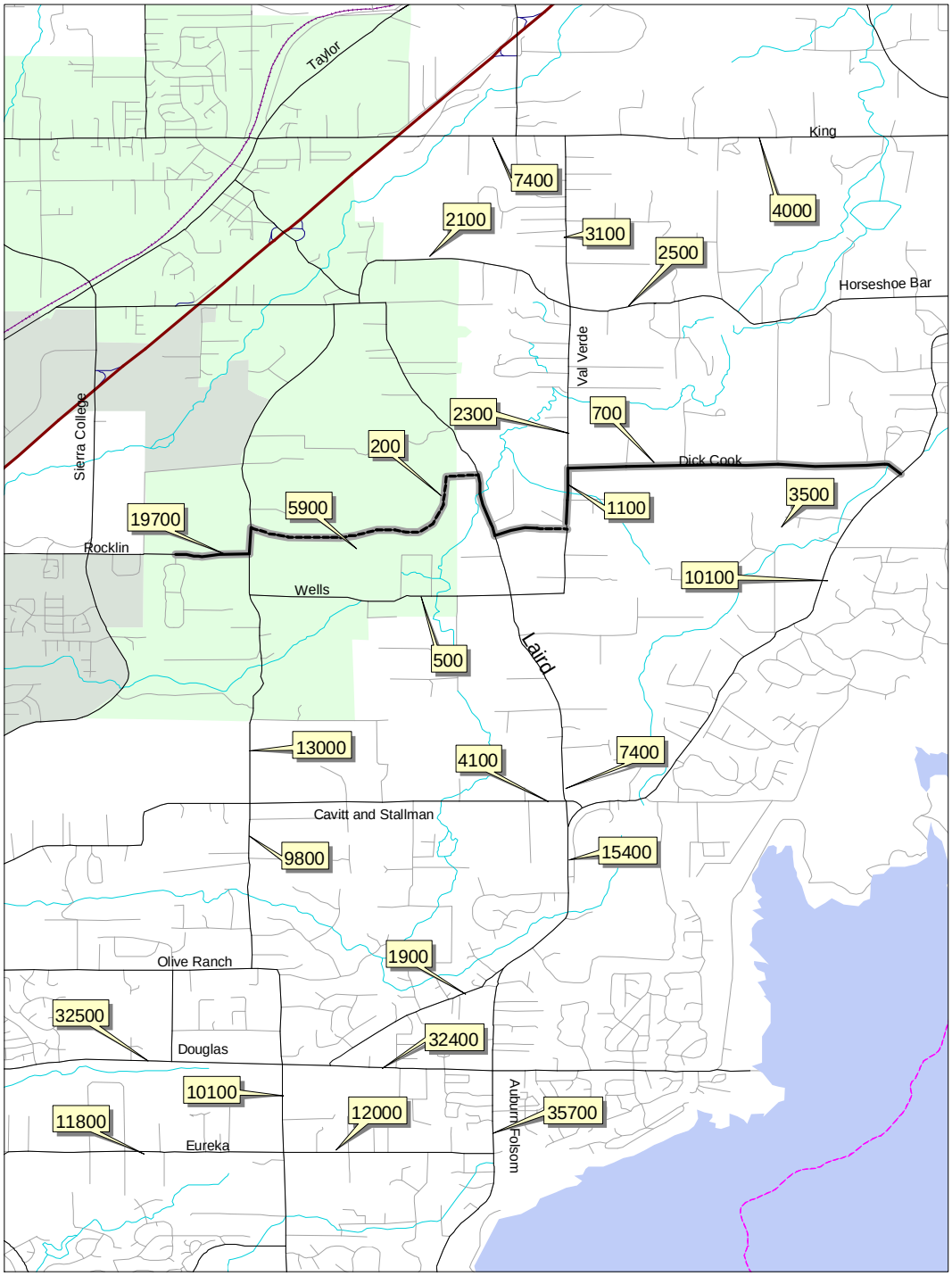
Figure 10: Functional Equivalent to Rocklin Road Extension



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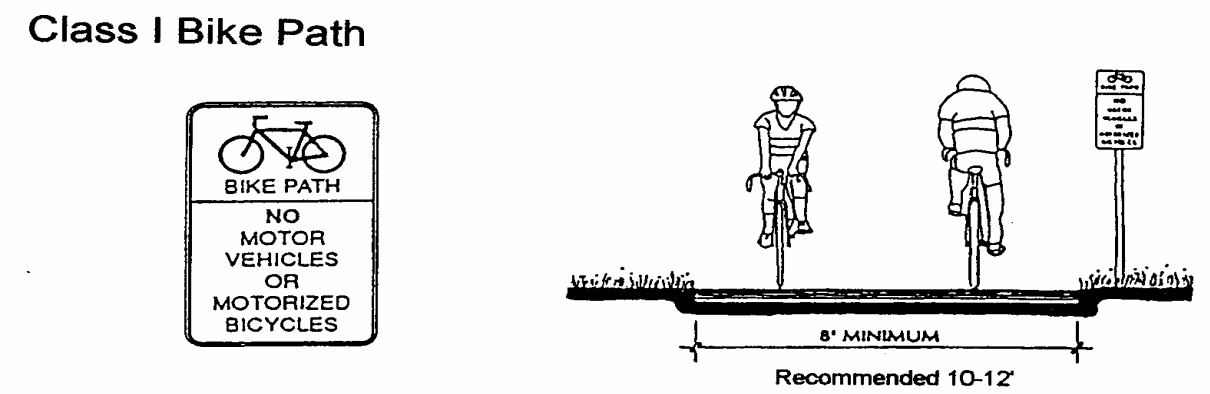
4. Bikeways

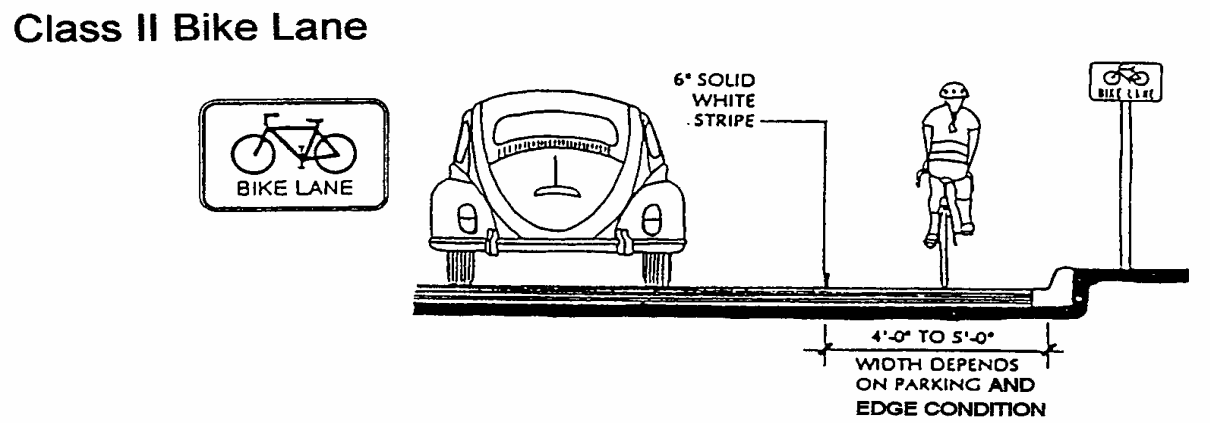
Definitions of Bikeways

In Placer County, as everywhere, there is a tremendous diversity of opinion on what is the best type of bikeway to focus on constructing. The three types of Bikeways described by Caltrans in their Highway Design Manual are as follows:

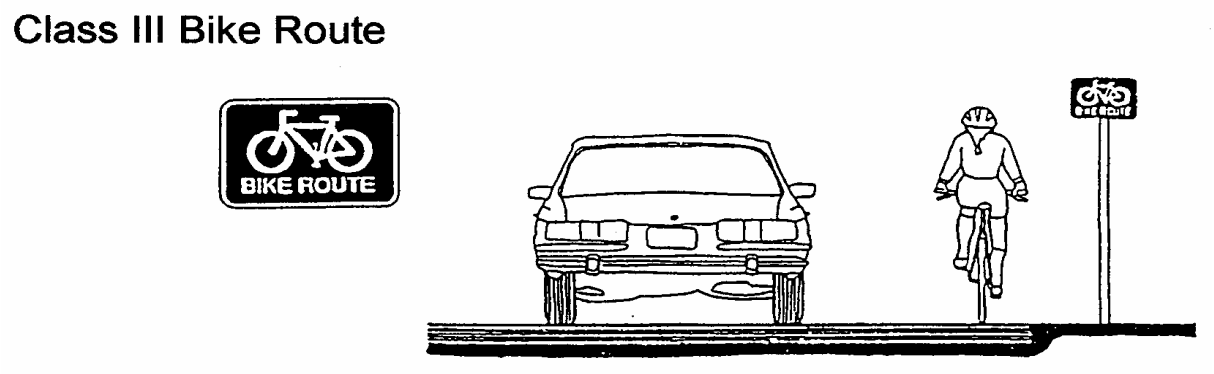
Class I Bikeway - Typically called a bike path or trail, it provides for bicycle travel on a paved right of way completely separated from any street or highway.



Class II Bikeway - Referred to as a bike lane. Provides a striped and stenciled lane for one-way travel on a street or highway. The right-of-way could be shared with vehicle parking.



Class III Bikeway - Referred to as a bike route. Provides for shared use with pedestrian or motor vehicle traffic and is identified only by signing.



Multi-Use Trail - If a pathway is to be used primarily for recreation use and not with transportation funding, it may be constructed to reflect local conditions and needs. In addition, in many areas (such as in rural areas), separate bicycle lanes are often not cost-effective. Cyclists will use the striped shoulders where they are suitable.

One of the greatest divergence of opinion lies between those who feel paved bike paths, separated from roadways should be constructed wherever physically possible, versus those who feel more comfortable riding on Class II bike lanes within the roadway right-of-ways. This preference is usually based on personal feeling regarding comfort and safety. These different needs and issues related to bicycle commuters and recreational bicyclists are described in Appendix A. This study took the following approach in selecting the most appropriate treatment for each proposed bikeway.

First, Class I bike paths are typically more popular than on-street routes because they attract a broader variety of users (including many non-bicyclists). Many people simply do not feel comfortable riding with auto traffic. Conversely, more experienced cyclists often avoid bike paths because they are crowded and full of unpredictable users. There is some evidence that suggests that there are more conflicts on bike paths than riding on-street. There is also evidence that suggests that bike paths may increase conflicts where they have numerous driveways or unprotected street crossings combined with limited visibility. Where there are transitions from bike paths to bike lanes, half the bicyclists must cross the road to be able to ride with traffic. Finally, bike paths cost about ten times more to build per mile than on-street bikeways. Based on this, it is recommended that Class I bike paths be constructed where they will serve a reasonable transportation function and do not duplicate adjacent on-street bike routes that offer a reasonable degree of comfort for the average user.

There are also people who argue whether Class II bike lanes are effective, or conversely, that bike lanes should be installed wherever possible. While there is no empirical data to suggest that bike lanes improve safety, according to recent studies they do help delineate the travel way for motorists and may help channelize motor vehicles.[1] In urban areas, bike lanes provide an additional buffer between traffic and sidewalks, aiding pedestrians. When properly designed, bike lanes help improve the visibility of bicyclists. On streets with low traffic volumes and speeds (under 5,000 vehicles per day,

[1] University of North Carolina

30 mph), bike lanes may not be needed at all. This is based on the potential for serious conflicts being so low that the cost of installing bike lanes is not warranted.

Existing Study Area Bikeways

The study area's rural and suburban setting, local recreational and scenic opportunities such as Folsom Lake, the generally level to rolling terrain and mild climate are all factors that contribute towards a favorable environment for bicycle transportation. The study area, which is primarily rural in character, consists of many narrow roadways with little or no shoulders. Rural roadways without shoulders become inappropriate for cycling as traffic volumes increase.

The existing bikeway system in the study area consists of an incomplete system of approximately 17.8 miles of bikeways, including 5.1 miles of multi-use pathways, 12.1 miles of bicycle lanes, and almost 2.5 miles of signed bicycle routes or other informal routes. Bicycles are allowed on all paved public roadways in the study area except Interstate 80.

Table 5 summarizes the existing bikeway facilities throughout the study area. There are several major multi-use trails within the study area. The Pioneer Express Trail, which runs through the Folsom State Recreation Area (FLSRA), connects Discovery Park with Auburn. A paved bike trail also connects Discovery Park with Beal's Point at Folsom Lake, while an approximate two-mile long Class I path links Auburn-Folsom Road with FLSRA near Boulder Road. There is also an approximately 0.5 mile long separated bike trail, classified as Class I, along Douglas Boulevard which runs from the Folsom Lake park entrance west towards Auburn – Folsom Road, which ends approximately at Oak Knoll Drive.

In the Granite Bay area, a Class II bikeway is located along East Roseville Parkway from the Roseville City Limits east to Barton Road. A Class II bikeway is also found on Wellington Way between Eureka Road and East Roseville Parkway.

In the Penryn/Horseshoe Bar area there exists a signed and striped Class III bikeway along Auburn-Folsom Road between King Road and Shirland Tract Road. A Class II bikeway exists on King Road from the Loomis Town Limits to Penryn Road.

Currently, the study area does not have an extensive or well-connected system of bike lanes. The study area is comprised primarily of a few disconnected Class II bike lanes and some Class I bike paths. The Granite Bay community appears to have the most extensive network of bike lanes and paths.

Gaps in the existing bikeway system does not mean that people are not riding. The bicycling community-ranging from experienced club riders to school children-has developed its own system of streets and routes that provide connectivity and safety for their purposes. Key observations on existing bicycling conditions include:

- There are a wide variety of bicycling environments ranging from rolling, open terrain, to quiet, easy, residential to urban and dense with high traffic volumes.

Table 5 Existing Bicycle Facilities in the Southeast Placer County Study Area		
Location	Type	Length (miles)
Pioneer Express Trail (FLSRA)	Class I	4.5
Douglas Blvd (Granite Bay Park to Oak Knoll Dr.)	Class I	0.6
Douglas Blvd. (Sierra College to Auburn-Folsom)	Class II	3.0
King Road (Loomis Town Limits to Penryn Road)	Class II	2.6
East Roseville Parkway (Roseville City Limits to Barton Road)	Class II	2.3
Sierra College Blvd (Sacramento County Limit to Cavitt-Stallman)	Class II	2.0
Sierra College Blvd (Rocklin Rd. to I-80)	Class II	1.0
Wellington Way	Class II	0.6
Eureka Road (Wellington to Sierra College)	Class II	0.6
Auburn-Folsom Road (King Rd. to Shirland Tract Rd.)	Class III	2.5
Total		17.8
Source: Alta Consulting		

- Auburn-Folsom Boulevard is a popular north-south route for bicyclists, which serves regional travel between the Granite Bay area, northern Sacramento County and the City of Folsom to the Auburn area. The County has made considerable shoulder improvements along this heavily trafficked corridor to accommodate bicyclist's needs.
- Circuitous residential street patterns in many of the communities in the study area make direct north-south travel along alternative routes to Auburn-Folsom Boulevard difficult.
- Many streets lack the proper signage needed to direct bicyclists along the bikeway routes through the County. Additionally, signage alerting motorists to cyclists and encouraging them to share the road is lacking.
- Many of the east-west routes are rural roadways with narrow shoulder widths, which may deter some cyclists.
- There is a general lack of bike lanes and connectivity between bike lanes.

Evaluation of Existing Bikeway Plans

As part of the Southeast Placer County transportation Study, a review of adopted bikeway plans within the study area and adjacent jurisdictions was conducted. An overview of these adopted plans is provided in Appendix A. The various bikeway master plans and community plan elements described in Appendix A all generally express the goals of providing a safe, efficient bikeway system, consisting of bikeways, paths and trails, which not only provides for local travel within communities, but also connects to regional bikeways and trail systems in the surrounding areas. The community plan documents also include policies, which mandate that road right-of-ways should be wide enough to accommodate such facilities as trails, paths and bikeway.

Figure 11 shows the planned bikeways within the study area and adjacent jurisdictions. While the community plans contain policies which state that regional bikeways should be located on or along collector or arterial roads, various roadways identified as collector or arterial roads either do not have any existing bikeway facilities or such facilities are not proposed in the plans. Dick Cook, Powerhouse, Gilardi and Brennans Roads are identified as collector roadways in the Horseshoe Bar/Penryn Community Plan, however these roads have not been recognized for bikeway improvements and leave potential gaps in the bikeway network.

The bikeway system currently proposed includes some key deficiencies. For example, on Laird Road a Class III route is planned from Auburn-Folsom to Wells Avenue and a Class II bike lane is proposed from Brace Road to Loomis' eastern town limits in Loomis. As proposed, this configuration would leave a gap on Laird Road from the Loomis town limits south to Wells Avenue.

There is also an issue related to the type of bikeway planned for Auburn-Folsom Road. The Granite Bay Community Plan calls for Class II bike lanes on the roadway while the Horseshoe Bar/Penryn Community Plan calls for a Class III route.

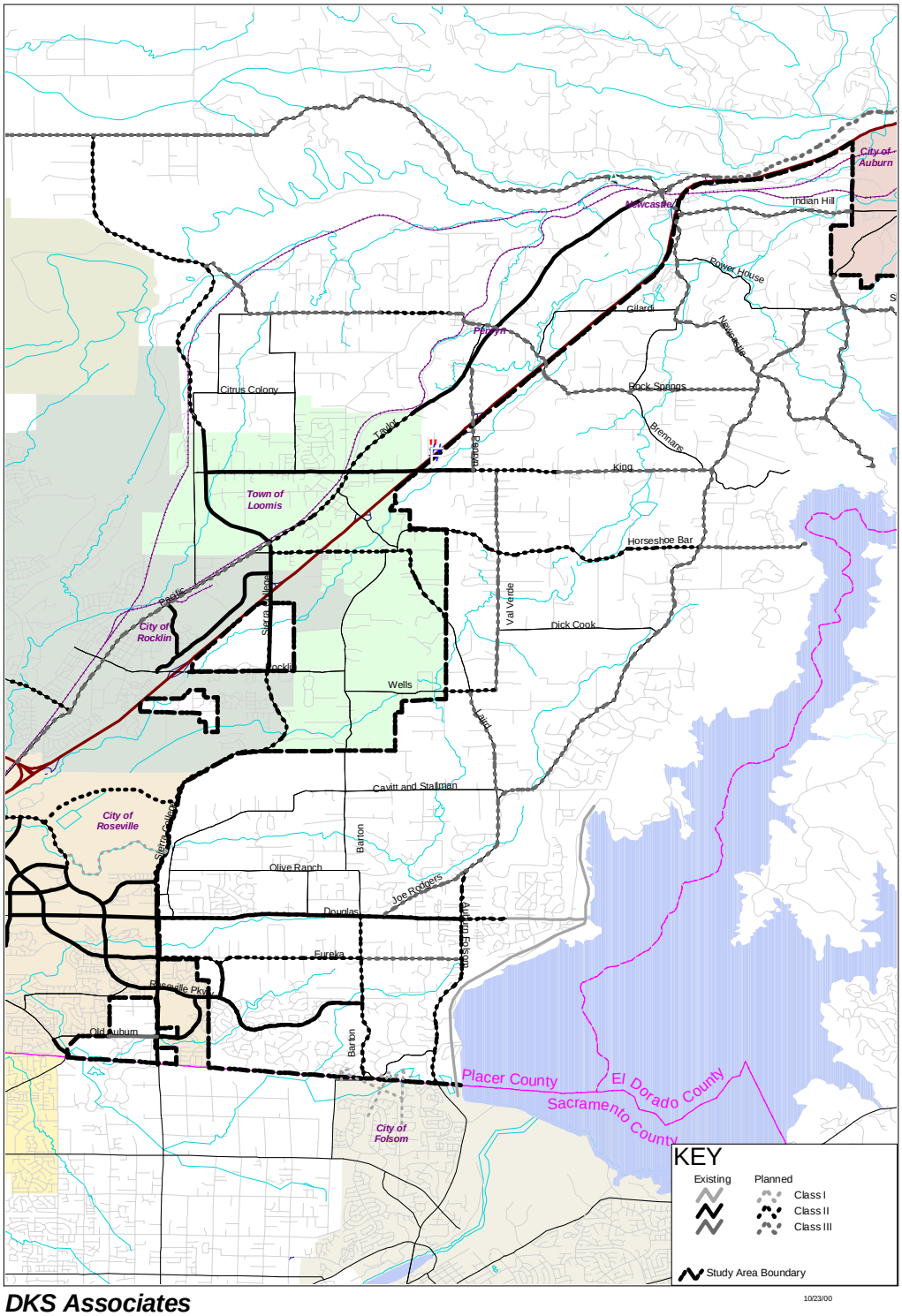
This would mean that the Class II bike lanes would end at the community plan boundary, Dick Cook Road, which does not have a planned bikeway and thus may not be an appropriate terminus. Auburn-Folsom Road currently has shoulders along its entire length, but only portions are wide enough to be striped and signed as a Class II bike lane. The County will provide Class II bike lanes on Auburn-Folsom Road when it is widened to four lanes (from the Sacramento County line to just north of Douglas Boulevard). However, Class II bike lanes on other sections of Auburn-Folsom Road might only be provided when adjacent development requires improvements to the roadway. Therefore, it should be determined whether Class II bike lanes are needed north of Douglas Boulevard, and if so, what is a logical terminus.

Public Comments on Bicycle Needs at Open Houses

Public workshops were held in Placer County for the purpose of identifying transportation needs. Attendees were asked to submit comments about transportation issues in the Granite Bay and Horseshoe Bar areas at the meeting. The following are a summary of the comments pertaining to bicycling and bicycling issues in the study area:

- Difficulty in accessing other trails and recreational facilities from Eureka Road by foot, bike or horse.
- Lack of access to the proposed Twin Schools Park.
- Lack of facilities to allow workers to bicycle commute between the cities of Folsom and Roseville.
- Heavy traffic volumes and high speeds of motor vehicles on Eureka Road, Elmhurst Drive, and Granite Bay are dangerous for bicyclists.
- Lack of bicycle lanes or paths on Eureka Road and Elmhurst Drive.
- Lack of signage alerting motorists of the presence of bicyclists.

Figure 11: Planned Study Area Bikeways



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- It is dangerous for children to ride their bicycles to school on Eureka Road.
- Roads in the area are narrow and unimproved.
- Lack of traffic enforcement towards speeders.
- The existing bike path on Douglas Boulevard is dangerous; it is not considered "bike friendly".
- Obstructions in sidewalk are dangerous to bicycle riders.
- Substandard pavement conditions on roads in the study area, particularly Eureka Road.
- Avoid open grade AC or AC overlay that ends in the middle of a shoulder or bike lane.
- Drainage runoff from open grade AC drains and puddles into bike lanes.

The public was also asked to provide suggested solutions to their transportation issues. In general these solutions include:

- Addition of bicycle lanes and trails for horses and walkers on roadways, such as Eureka Road, Auburn-Folsom Road, Rocklin Road and Sierra College Boulevard.
- Provide bicycle access to Sierra College via Rocklin Road and Sierra College Boulevard.
- Usage of directional signage to direct users to the trails along roadways.
- Signage to alert motorists to bicyclists and children riding bikes to school.
- Repave and widen roads to accommodate bicycle lanes.
- Divert traffic off of Eureka Road onto Douglas Boulevard.
- Improve roadways.
- Increased traffic enforcement to curb speeding during school hours.
- Provide through access for bicycle commuters from Folsom to Roseville.
- Provide bike lanes on Elmhurst Drive in Treelake Village for school children.
- Provide bicycle safety and education programs for school children.
- Enhance the attractiveness of bicycling by separating bikeways and trails from roadways using trail dedications.
- Prohibit free right turns at all intersections; otherwise the turning radius should be tight.
- Improve connection from Olive Ranch Road to Sierra College Boulevard, possibly with a signal, and add a connection from Olive Ranch Road to Olympus Drive.
- Bike lanes should have sensitive signal sensors at all intersections. These sensors should also provide a sufficient green light phase to allow bicyclists time to cross.

- Add bicycle sensitive sensors whenever roadway intersections are improved and bicycle lanes are present.

Residents were generally against widening the roads at the expense of losing the rural character of their communities and attracting additional through traffic. However, widening roads for bicycle lanes was generally supported.

Recommended Bicycle Design Standards

The Caltrans Highway Design Manual contains specific design guidelines that should be adhered to in California. Bikeway Planning and Design sets the basic design parameters of on-street and off-street bicycle facilities, including mandatory design requirements. While these guidelines should be followed, in some instances flexibility from the specifications is allowed. This report does not make recommendations related to most of the design parameters, only those related to roadway cross sections, as discussed in Section 6 of this report.

Bicycle System Recommendations

The following recommendations relate to the planned bikeways in the Southeast Placer County Transportation Study Area and potential modifications to the Auburn/Bowman, Granite Bay and Horseshoe Bar/Penryn Community Plans as well as the Placer County General Plan.

1) Change the proposed Class III bikeway on Eureka Road from Barton Road to Auburn-Folsom to proposed Class II bikeway.

2) Link the proposed Class III bikeway on Laird Road from Wells Avenue north to the proposed Class II bikeway in Loomis with a Class III or II bikeway.

3) Provide Class III or Class II bicycle access on Elmhurst Drive.

4) Provide a link to the proposed Class I path along Linda Creek east of Sierra College Boulevard, which is being considered as part of a proposed development in eastern Roseville and is proposed to extend into Placer County.

5. Roadway Standards

Roadway Functional Classifications

The *Circulation Plan Diagram* for the *Countywide General Plan* depicts the proposed circulation system for unincorporated Placer County to support development under the *Land Use Diagram*. Figure 12 shows the "functional classifications" for the roadways in the study area. The roadway classification system had been developed to guide Placer County's long-range planning and programming. Roadways are classified in this system based on the linkages they provide and their function, both of which reflect their importance to the land use pattern, traveler, and general welfare.

Roadways have two functions, which conflict from a design standpoint: to provide mobility and to provide property access. High and constant speeds are desirable for mobility, while low speeds are more desirable for property access. A functional classification system provides for specialization in meeting the access and mobility requirements of the development permitted under the *General Plan*. Local streets emphasize property access; highways and arterials emphasize high mobility for through-traffic; and collectors attempt to achieve a balance between both functions.

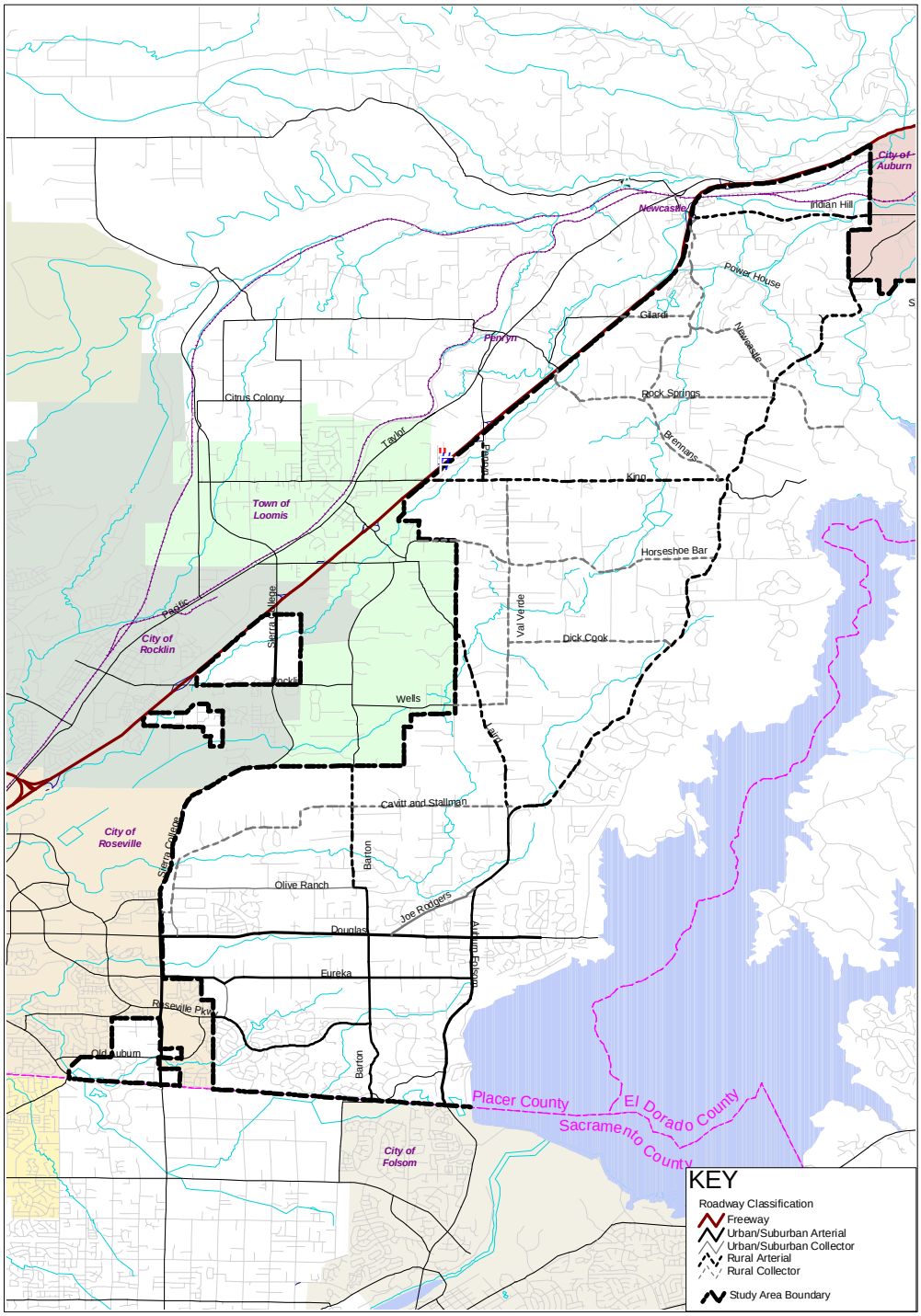
The *Circulation Plan Diagram* represents the official functional classification of existing and proposed streets, roadways and highways in Placer County. Figure 12 shows the arterial and collector roadways in the study area. All other roadways are classified as local streets. The County's functional classification system recognizes differences in roadway function and standards between urban/suburban areas and rural areas. The following paragraphs define the linkage and functions provided by each class.

Arterial roadways are fed by local and collector roadways and provide linkages to the State highway system as well as linkages to and between communities and major activity centers. The public uses these roadways as primary circulation routes for through traffic, and they carry higher volumes of traffic than local streets and collector roadways. In urban/suburban area, major arterials will generally carry higher traffic volumes than minor arterials and thus require more right-of-way and have more access restrictions. Rural arterial roadways may or may not carry high traffic volumes, but do provide primary access routes for through travel in rural areas of the county.

Collector roadways are intended to "collect" traffic from local streets and carry it to roadways higher in the street classification hierarchy (e.g., arterials). The public uses these roadways as secondary circulation routes, and they generally carry light to moderate traffic volumes. Access to abutting land is normally permitted, but may be restricted to certain uses dependent upon future traffic volumes. The collector roadway system is depicted on the Circulation Plan Diagram. In urban/suburban areas, major collector roadways will generally carry higher traffic volumes than minor collectors and thus require more right-of-way and have more access restrictions.

Local streets provide direct access to abutting land, and access to the collector street system. The public uses these streets for local circulation. They carry little, in any, through traffic, and generally carry very low traffic volumes. These streets are not depicted on the *Circulation Plan Diagram*.

Figure 12: Area Roadway Classifications



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Thoroughfares are special arterial roadways with greater access control designed to carry high volumes of traffic with limited travel delay. Such roadways are used as primary circulation routes to carry longer-distance, through-traffic.

Recommended Cross-section Standards for Two Lane Roadways

Placer County is concerned that its typical roadway cross-section standards for two-lane "residential" roadways may be promoting higher than desirable speeds. DKS has defined a set of potential cross-section standards that could be considered for arterial/collector roadways and for local roadways. These standards attempt to use recommendations from several state and federal agencies.

Arterial and Collector Roadways

Table 6 shows a potential set of roadway cross-section standards for two lane arterial and collector roadways. These standards vary by traffic volume, travel speed and whether the roadway has designated on-street Class II bike lanes. For arterial and collector roadways where driveway access is limited and high speed is acceptable, an 11 or 12-foot travel lane is recommended. For roadways that have a significant number of residential driveways and it is desired to keep speeds low, travel lanes can be reduced to 10 feet, while shoulders or bike lanes can be made a foot or two wider.

Table 6
Potential Cross-section Standards for Two -lane Arterial and Collector Roadways

Daily Traffic Volume [1]	Posted Speed (mph)	Not a Designated Bike Route			Designated Bike Route		
		Lane Width (ft)	Shoulder Width ft)	Total Pavement Width (ft)	Lane Width (ft)	Bike Lane Width (ft)	Total Pavement Width (ft)
10,000 to 14,400	Over 40	12	6	36	12	6	36
	40 or less	10	6	32	10	6	32
2,000 to 10,000	Over 40	12	4	32	12	4	32
	40 or less	10	4	28	10	6	32
Less than 2,000	Over 40	11	3	28	11	4	30
	40 or less	10	2	24	10	5	30

[1] Roadways with daily traffic volumes greater than 14,400 will typically require more than 2 lanes to meet Placer County's level of service "C" policy. Additional roadway and right-of-way width will be required for turn lanes at intersections with other arterial and collector roadways, and potentially some local cross-streets.

Local Roadways

For rural local roadways that do not have sidewalks the recommended roadway standards listed in Table 6 would still apply. These roadways would typically have daily traffic volumes less than 2,000 vehicles.

For local residential streets in urban/suburban areas where sidewalks are provided, a pavement width of 28 to 32 feet is recommended. The width should vary based on the level of on-street parking and traffic volumes, as shown in Table 7. The recommended pavement width allows adequate space for on-street parking and width for vehicles to pass, but not excessive width that would promote high speeds. It is not recommended that new streets with residential frontage be allowed to have volumes greater than 2,000 vehicles per day.

Table 7
Recommended Width
Residential Streets in Urban/Suburban Areas with Sidewalks

Curb to Curb Pavement Width	On-street Parking and Traffic Volumes
28	Low level of on-street parking (except during occasional events at residences) and daily traffic volume less than 250 vehicles
30	Low level of on-street parking (except during occasional events at residences) and daily traffic volume between 250 to 750 vehicles
32	High levels of on-street parking and/or daily traffic volume 750 to 2,000 vehicles

Note: It is not recommended that new roadways with residential frontage be allowed to have daily traffic volumes greater than 2,000 vehicles

Consistency and Coordination with Adjacent Jurisdictions

The unincorporated portions of the Southeast Placer County study area border the cities of Auburn, Rocklin, Roseville and Folsom, the Town of Loomis and Sacramento County. There are a number of existing and potential Placer County roadways that cross these jurisdictional boundaries. The adjacent jurisdictions have their own roadway classification systems and roadway standards, which in a few cases pose potential compatibility issues on roadways that cross these boundaries. It is important that Placer County understands the roadway standards of its neighbors and works with them to minimize these issues.

Most of the unincorporated portions of Placer County within the study area are classified as rural. Roadways in these rural areas will have a rural design standard with shoulders rather than an urban street standard with curbs, gutters and sidewalks. The most critical issue that will require coordination with adjacent jurisdictions is where the County's rural-designated roadways flow into urban-designated roadways at the border with adjacent jurisdictions. If a rural standard or an urban standard is used on both sides of a border, than the County still may have compatibility issues and will need to ensure that an appropriate "transition" is used to compensate for any differences in roadway width or design features.

A general assessment of potential issues, by adjacent jurisdiction, can be summarized as follows:

- City of Auburn – The major roadways within the study area that cross the County's border with the City of Auburn include Auburn-Folsom Road and Shirland Tract Road. These roadways will have a rural standard on both sides of this border. The proposed Capital Improvement Program (CIP) for Southeast Placer County (see Appendix E) calls for some widening for shoulders or shoulder/bike lanes on these roadways, and thus the roadway width may vary on either side of the border. While the County needs to coordinate potential transitions due to any differences in the widths of shoulders and/or travel lanes, there should not be major issues related to roadway standards.

- City of Rocklin – Sierra College Boulevard and Rocklin Road are the key roadways within the study area that crosses Placer County's border with the City of Rocklin. Placer County also has two unincorporated "islands" that border Rocklin: the Greenbrae Island and the Sierra College campus. Roadway standard issues are not anticipated on Sierra College Boulevard, Rocklin Road or with connections to the college campus. The Greenbrae Island portion of Placer County, however, poses some of the most complex roadway standard coordination issues in the Southeast Placer County study area. These issues are discussed later in this section.

- City of Roseville – The roadways within the study area that cross the County's border with Roseville include Douglas Boulevard, East Roseville Parkway and Sunrise Avenue. Placer County also "shares" several roadways with the City of Roseville, with half the roadway in each jurisdiction, including Sierra College Boulevard, Eureka Road and Old Auburn Road. The County and City will use an urban standard on all of these shared roadways. Eureka Road will use a rural standard east of Wellington Way. Placer County intends to widen its side of Eureka Road between Wellington Way and Sierra College Boulevard and complete its portion of the widening of Sierra College between the Sacramento County line and Cavitt Stallman Road. The County has been coordinating the design of these joint improvements, so there should not be major issues related to roadway standards on Eureka Road, or Sierra College Boulevard. The north side of Old Auburn Road west of Sierra College Boulevard may eventually be improved to an urban roadway standard (with sidewalks and on-street bike lanes) if development occurs in this portion of the unincorporated County. The City of Roseville intends to widen Sunrise Avenue to 6 lanes in the future. When this occurs, there may be desire to be widened Sunrise Avenue through the Livoti Tract area of unincorporated Placer County. Placer County will need to coordinate any issues related to roadway standards for Sunrise Avenue with the City of Roseville and potentially Sacramento County.

- City of Folsom - Auburn-Folsom Road is the key roadway within the study area that cross the County's border with the City of Folsom. The proposed Capital Improvement Program (CIP) for Southeast Placer County (see Appendix E) calls for a widening to four lanes with shoulder/bike lanes on Auburn-Folsom Road. The City of Folsom is moving forward with it own four-lane widening of Folsom-Auburn Road. While Placer County needs to coordinate potential transitions due to any differences in the widths of shoulders and/or travel lanes used by the City of Folsom, there should not be major issues related to roadway standards on these roadways.

- Town of Loomis – The existing roadways within the study area that cross the County's border with the Town of Loomis include Barton Road, Laird Road, Horseshoe Bar Road and

Wells Road. The proposed Capital Improvement Program (CIP) for Southeast Placer County (see Appendix E) calls for some widening for shoulders or shoulder/bike lanes on these roadways, and thus the roadway width may vary on either side of the border. While the County needs to coordinate potential transitions due to any differences in the widths of shoulders and/or travel lanes, there should not be major issues related to roadway standards. The Southeast Placer County Transportation Study recommends elimination of the proposed Rocklin Road Extension from General Plan Circulation Element and Community Plan and instead provide a "functional equivalent" to that extension via new connection between Laird Road and Val Verdi Road. This connection would cross the County's border with the Town of Loomis and require design coordination.

- Sacramento County - The roadways within the study area that crosses Placer County's border with the unincorporated portion of Sacramento County include Sierra College Boulevard, Barton Road and Sunrise Avenue. Placer County and Sacramento County are implementing a joint project to widen Hazel Avenue and Sierra College Boulevard between Oak Avenue and just south of Old Auburn Road. Placer County, Sacramento County and the City of Folsom are working together on improvements/realignment to Barton Road and Santa Juanita Avenue. Any issues related to roadway standards on Sierra College Boulevard and/or Barton Road at the County line will be resolved through these joint efforts. Sunrise Avenue also traverses the narrow Livoti Tract area of unincorporated Placer County as it runs between Roseville and Sacramento County. Issues related to Sunrise Avenue are discussed above under coordination with the City of Roseville

Placer County has a few isolated "islands" of unincorporated areas in the southeast portion of the County, including Greenbrae Island and the Livoti Tract.

The "Greenbrae Island" portion of Placer County has several existing and potential roadways that cross into the City of Rocklin, including Greenbrae Road, Aguilar Road and China Garden Road. The Rocklin portion of these roadways will serve some proposed new developments that will have an urban standard with curbs, gutters and sidewalks. No improvements are proposed for the unincorporated portions of these roadways, which do not currently have curbs, gutters and sidewalks.

The unincorporated portion of Aguilar Road may be closed north of Greenbrae Road. If this roadway were closed, then the difference in roadway standards would not be a major issue. Rocklin's standard calls for 32 feet of pavement plus curbs, gutters and sidewalk on its portion of Aguilar Road. If Aguilar Road is kept open, then the County should use an urban standard with 32 feet of roadway plus curbs, gutters and sidewalks on Aguilar Road.

The south side of Greenbrae Road is located in the City of Rocklin while the north side is in located in the unincorporated portion of Placer County. Rocklin intends to improve Greenbrae Road with curbs, gutters and sidewalks along its south side. Greenbrae Road may or may not be extended eastward to connect to Southside ranch Road. Even if it is not extended, the County should use of an urban standard with curbs, gutters and sidewalks along the north side of Greenbrae Road to be consistent with the design on the south side of this road.

The Livoti Tract lies between the City of Roseville and the Sacramento County line and extends from just east of Riverside Boulevard to just east of Sunrise Avenue. There are a few local roadways from this tract that cross the borders with the City of Roseville and/or Sacramento County. Improvements to these local roadways are not planned and there should not be major issues related to roadway standards for these local roads. Sunrise Avenue also traverses the narrow Livoti Tract area of unincorporated Placer County as it runs between Roseville and Sacramento County. Issues related to Sunrise Avenue are discussed above under coordination with the City of Roseville.

6. Potential Framework for Implementing Neighborhood Traffic Management

Introduction

As a result of continued growth in Placer County, there is a greater potential for the quality of life in residential neighborhoods to be impacted by increased traffic volumes and speeding. Some neighborhoods in the County may already experience these problems and their detrimental effects on safety and livability. Left unmanaged, the County could find itself responding to these issues in an inefficient, case-by-case manner.

As part of the *Southeast Placer County Transportation Study*, DKS Associates has been asked to outline a potential framework for implementing Neighborhood Traffic Management (NTM). We were also asked to conduct two NTM "case studies" on Eureka Road and Elmhurst Drive (see Appendix D). This section provides some options on how the County can address neighborhood traffic issues, not just in Southeast Placer County, but countywide, based on examples from other communities around the U.S.

Background

The purpose of Neighborhood Traffic Management (NTM) is to address the negative impacts of unchecked traffic speed and volume on neighborhood streets. Neighborhood traffic management encompasses a wide range of measures and activities that are effective in curbing the causes of these impacts, thus improving the livability of a neighborhood. While there are a wide range of issues that are commonly addressed by NTM, the bottom line is mitigating the speed and volume of vehicle traffic on local streets.

While the need for NTM can generally be attributed to growth in the local community, other factors also play a role in creating this need. One of these factors is the growth in through travel from other jurisdictions that Placer County can't control. For example, the projected growth in travel between the Roseville/Rocklin area and the Folsom/El Dorado Hills area is expected to significantly impact roadways in Granite Bay. Other factors include the lack of regional or arterial roadways in critical areas and resulting connectivity issues. For example, the physical constraint of Folsom Lake concentrates traffic on a limited number of arterial roadways in Folsom and Granite Bay. The combination of these and other factors can lead to a congested arterial street system and the desire for drivers to find alternative routes. Often these alternatives are local, neighborhood streets.

Arterial congestion and lack of connectivity are the leading causes of cut-through traffic on neighborhood streets. The County has, and will continue to work on identifying the causes of congestion and lack of connectivity, and correcting these issues – if possible – before looking to implement NTM measures. Solutions to congestion or lack of connectivity may be the best long-term NTM measure. The County recognizes, however, that in some areas improvements to the arterial system will be difficult and that traffic impacts are immediate concerns to neighborhoods. As such, it may be desirable to consider and not postpone less-expensive solutions for the sake of long-term planning, design and construction of arterial capacity.

Neighborhood traffic management measures are a means of addressing traffic safety issues on a countywide basis. As such, their application should not be limited to just local streets. NTM measures should be used to increase safety for pedestrians, bicyclists and motorists regardless of street classification. However, it should be recognized that not all NTM measures are appropriate for all streets. Where appropriate, NTM measures may be installed in neighborhoods to limit speed and volume of traffic; on collector streets to reduce speeding traffic and enhance pedestrian safety; and on arterials to enhance neighborhood pedestrian safety. Often a combination of solutions may be required.

While most NTM measures focus on retrofitting roadways to relieve existing problems, the most opportune time to address neighborhood needs is in the land use review process. Whether it is a residential subdivision, commercial development or a transportation project, incorporating NTM elements into the design, development and mitigation of the off-site impacts of the project will limit the growth in neighborhood problems. To best address these issues, a two-tiered approach is recommended. The first tier is aimed at new residential development planning and the second tier is focused on mitigating impacts of new land use or transportation development.

Neighborhood traffic management programs are built off the three "E's" of transportation:

- **Education:** Make people aware of the problems, and that they can help by slowing down, and/or staying on arterials/collectors.
- **Enforcement:** By focusing law enforcement efforts to acknowledged areas of concern, community awareness of speeding problems can be increased.
- **Engineering:** There are several traffic calming measures that can be designed and built to reduce speeding and/or affect traffic volume.

Comprehensive NTM programs incorporate each of the three "E's" in a multi-phased plan and include the following major components that work together to produce a complete NTM program:

- **Policies:** The NTM program should have a set of goals and policies adopted by the Board of Supervisors to lay the foundation for its process, criteria and standards.
- **Process:** Outlines how an existing problem is brought to the County, what are the thresholds/warrants for defining a problem, procedures toward a solution, prioritization and funding of the project and monitoring of the benefit/impact.
- **Criteria:** Determines which problems are significant enough to require intervention of some form. The criteria can be used as a warrant or threshold under which NTM can be considered and under which it is not considered. Some jurisdictions have the thresholds and combine them with a prioritization process.
- **NTM Tool Box:** Provides a list of NTM measures that the County considers appropriate. Often there is a separate list of measures for each functional class of roadway (i.e. local, collector and arterial roadways).
- **Standards:** This provides a uniform way for NTM measures to be implemented in the County. It provides a process to minimize the impacts to safety and other users/stakeholders.

- **Land Use Review** Addresses potential future problems by mitigating impacts of land use projects at the time of approval rather than after the impact. This is done in two steps: 1) integrating NTM policies, measures and concepts into site planning; and 2) requiring projects creating the greatest impacts on neighborhood livability to mitigate their impact.

The following sections discuss each of these elements of a comprehensive NTM program.

Policies

A comprehensive NTM program requires resources and a clear process to be successful. To lay the foundation for a new program like this, the Board of Supervisors should adopt an appropriate set of policies related to the NTM process. To establish those policies, the Board would need to understand the pros and cons of various NTM programs.

The Transportation and Circulation Element of the Placer County General Plan already contains the following general policy related to NTM:

> *Policy 3.4.5 - Through traffic shall be accommodated in a manner that discourages the use of neighborhood roadways, in particular local streets. This through-traffic, including through truck traffic, shall be directed to appropriate routes in order to maintain public safety, and local quality of life.*

Ideally, additional policies would be adopted that help define the NTM process. Such policy statements could cover some or all of the following:

- The establishment of guidelines for defining neighborhood traffic problems and balancing identified needs with fiscal and staffing constraints.
- That Neighborhood Traffic Measures should be multi-modal and not negatively impact emergency response vehicles, pedestrians, bicycles, etc.
- Development of design standards.
- Use of a prioritization process.
- Relationship of NTM projects to arterial capacity improvements.

Process for NTM Program

An NTM program can be set up several ways. This section describes some of the options for consideration.

- **Neighborhood Complaint Program.** Many communities, (including Placer County) that do not have organized NTM programs, use this approach. NTM issues are responded to item-by-item that based on requests from individuals or groups and are implemented as funding exists, per the Board of Supervisors final approval.

- **CIP Related Program.** This process places NTM projects in competition with all transportation projects. An annual funding set aside or competitive process could be used. The projects would be developed, planned, designed and implemented similar to any transportation improvement on the CIP list, using criteria in planning and development. These programs can develop NTM prioritization lists based upon rating systems/point scoring. The criteria for evaluation of the NTM project can be used as a means for it to compete with other capital projects.

- **Warrant/Threshold Program.** This approach sets minimum thresholds or warrants in place that define various NTM responses. Criteria can be used to set the various thresholds. For example, humps not being considered on various street classifications or where volumes or speeds are below minimum levels. This can also be built in a progressive fashion where the criteria determine the course of action rather than rating or prioritization.

- **Multi-Phase NTM Program.** Used in some cities and counties, the NTM program can be set up at various levels that progressively move toward physical improvements. Some jurisdictions have a four phase program where one phase leads to another:

  Phase 1 is problem identification and action plan preparation. This involves neighborhood petitioning, site visit, initial data collection, plus rating and defining an action plan.
  Phase 2 involves initial actions including the use of resident participation programs, banners, speed watch programs, speed trailers, etc.
  Phase 3 involves enhanced enforcement and signage.
  Phase 4 involves gaining neighborhood support for and implementing capital improvements (humps, circles, etc…).

It is our experience that a multi-phase NTM program is the most effective because it ensures 1) that there is adequate input from all stakeholders; 2) that the greatest needs are met first; and 3) low cost and impact measures are considered first.

Appendix B provides an example of a multi-phase NTN program that includes example criteria and a potential scoring system for prioritizing NTM projects.

An NTM program will require additional resources, including Placer County staff time and funds to implement NTM measures. The level of resources needs to be addressed when the program is established. The County must also recognize that while NTM measures are intended to solve traffic problems in residential areas, they do have impacts and will generate some controversy.

Criteria

One of the first elements of building a process to address NTM is having criteria to determine which problems are significant enough to require intervention of some form. Most jurisdictions with NTM programs use criteria in two ways. First, the criteria can be used as a warrant or threshold under above which NTM can be considered and under which it is not considered. Some jurisdictions have the

thresholds and combine them with a prioritization process. This second use of criteria is very common to cities and counties with NTM programs.

Most of the criteria are used in a point system of scoring, with the points for each criterion being combined to produce a rating. The rating is used in a countywide program to assure that the greatest needs are met first and to allow citizens to see how their problems match up with those through out the county. Some of the typical criteria that could be considered are shown in Table 8.

Each of the criteria will require measures that can be quantified. Without the ability to measure the criteria objectively, the ability to assess area wide needs in the County is eliminated from a technical context. A potential measure is identified in Table 8 for each of the criteria.

In the development of the policy framework in other communities, specific thresholds and point systems have been developed for each criteria and measure. Table 9 shows an example of initial thresholds that have been used in other communities for a project to be considered for an NTM program.

Table 8
Potential Criteria for Determining and Prioritizing Neighborhood Traffic Problems

Criteria	Measurement	How to obtain
Speed	Miles per Hour	Road Tube Surveys Spot Speed Surveys (radar)
Volume	Vehicles per Day	Road tube surveys
Pedestrians	Sidewalks Present Pedestrian Volume	Field survey Manual field counts
Street Classification	Functional Class	General Plan
Amount of Cut Through Traffic	Vehicles per Day (volume) % Traffic that Cuts Through	License plate survey License plate survey
Impacts to Emergency Route	Yes/No/Some Time Delay	Based on Fire Dept. input Estimates (difficult to measure)
Amount of Traffic Diversion (to other neighborhood streets)	Vehicles per Day	Placer County Traffic Model (or manual estimate for local streets)
Cost	Dollars	Estimate based upon selected measure
Key Land Use	Distance (feet) Adjacent to Use	Locate/distance to parks, institutional uses, retail centers, transit stop, etc…
Pavement Condition	Good/Fair/Poor/Bad Rating	Pavement Management System Rating
Residential Acceptance	% Supportive	Petition of neighborhood
School Zone	Distance (feet)	Map of schools and measured distance
Bus/Truck Route	Bus Routes (yes/no) Truck Routes (yes/no)	PCT map/school bus map Map

Table 9 Potential Thresholds for NTM			
Functional Class	Speed	Volume	Fronting Land Use
Local Street	Median speed > 28 to 33 mph	750 vpd	> 75% residential and institutional (including parks)
Collector Street	Median speed ≥ Posted speed	None	> 75% residential and institutional (including parks)
Arterial Street	Median speed ≥ Posted speed	None	> 75% residential and institutional (including parks)

NTM Toolbox

The County should establish a set of appropriate measures that it would consider for mitigating neighborhood traffic problems. The use of a Citizen Advisory Committee to establish a NTM "toolbox" at the beginning of an NTM program can eliminate the need to discuss inappropriate measures for each application. It would allow the County to clearly state that most NTM measures are appropriate for local roadways, and few are appropriate for arterial roadways. Table 10 shows an example of a NTM toolbox from another community. Appendix C describes these NTM measures.

Table 10 Example of NTM Tool Box		
Local	Collector	Arterial
Chicane Choker Circle Diverter Pavement Texture Speed Hump On-street parking One way entry/exit Truck Restrictions Turn Restrictions Street Trees	Pavement Texture On-street parking One way entry/exit Truck Restrictions Turn Restrictions Medians Curb Extensions Roundabouts Street Trees	Medians Curb Extensions Streets Trees
For New Construction (not retrofit), also Consider		
Local	Collector	Arterial
Connected Curvilinear Street Medians Narrow Street Street Grid Shared Space		

Standards for NTM

Implementing NTM measures can impact several stakeholders that use public streets – from utilities to garbage companies, delivery companies to school buses, from emergency services to maintenance,

from the postal service to the school district. The needs of all the stakeholders should be considered in any NTM measure. To best address the input of key stakeholders, it is recommended that a series of design standards be developed, reviewed and approved for inclusion in the County Design Standards. This process will allow critical input and review by the stakeholders at one point, rather than having to seek each stakeholders input for each NTM project that is contemplated.

The benefit of developing design standards is that NTM can be uniformly applied in Placer County. The standardization of NTM elements also helps keep the costs down. Most importantly, by going through a process of adopting the design standards with stakeholder input, the potential liability to the County is significantly reduced.

The development of standards can build off experience with NTM throughout the United States in tailoring a set of standards that meet Placer County's needs. As long as the standard of design is adhered to, the stakeholders can be assured of the character and nature of what may impact the street in relation to their operational needs.

The Manual of Uniform Traffic Control Devices (MUTCD) provides a reference for most traffic signing and striping needs. While MUTCD does not address many of the NTM measures outlined in the toolbox, many other cities have working design experience with all of the measures.

Land Use Review

While the prior sections focus on the implementation of NTM in retrofit situations, the most opportune time to address neighborhood needs is the point of development. Whether it is a residential subdivision, commercial development or a transportation project, incorporating NTM elements into the design, development and mitigation of the off-site impacts of the project assures that the inventory of neighborhood problems does not grow. To best address this through policy, a two-tiered approach is recommended.

The first tier is aimed at new residential development planning and merely adds an additional step to a typical traffic impact analysis. On all single family residential projects, any internal street that is forecast to have traffic volumes that exceed an adopted threshold (say 500 vehicles per day either at project completion or ultimately due to stub street connections) should be designed utilizing NTM measures or concepts to ensure traffic speeds and volumes will remain at acceptable levels.

The second tier is focused on mitigating impacts of new land use or transportation development. Placer County already requires that major new land development projects provide information in their traffic impact analysis that identifies the potential impact on neighborhood or local streets. Yet this analysis would go beyond the capacity analysis and mitigation that is typically conducted by requiring mitigation if volumes on a local residential street would exceed the adopted threshold for consideration in the NTM program.

7. Study Recommendations

This section provides DKS Associates recommendations for transportation improvements, studies and measures for the Southeast Placer County study area. While we have attempted to consider solutions proposed by the public at the open houses held during the study (see Section 8), our recommendations are based on technical analysis and the best engineering/planning practices.

Arterial and Collector Roadway Improvements

1) Work with PCTPA, SACOG and neighboring jurisdictions to address possible regional solutions to anticipated growth in "through traffic" to Granite Bay. This may include roadway, transit and/or travel demand management solutions.

2) Modify the level of service policies in the Granite Bay and Horseshoe Bar/Penryn Community Plans to allow exceptions to LOS C standard (i.e. allow LOS D or E where required improvements to achieve LOS C results in unacceptable impacts). Then plan for the following improvements:

   - Widen Auburn-Folsom Road to 4 lanes (with bike lanes) from Sacramento County line to north of Douglas Boulevard.
   - Maintain 4 lanes on Douglas Boulevard between Auburn-Folsom Road and Cavitt-Stallman Road but preserve right-of-way for 6 lanes if needed in long-range future.
   - Widen Douglas Boulevard to 6 lanes from Cavitt-Stallman Road to Sierra College Boulevard (adjacent to the commercial development)
   - Maintain 2 lanes on Eureka Road but widen to provide shoulder/bike lanes and left turn lanes at key intersections plus preserve right-of-way for 4 lanes if needed in long-range future.
   - Add turn lanes that would provide at least LOS D conditions in 2020 at major intersections including (but not limited to) the following:
     – Douglas/Cavitt-Stallman
     – Douglas/Barton
     – Douglas/Auburn-Folsom
     – Eureka/Barton
     – Eureka/Auburn-Folsom
   - Recognize that the intersection of Douglas Blvd and Sierra College Blvd currently operates at LOS F conditions during the peak hour. Implement the maximum feasible at-grade improvements at this intersection (i.e. 2 left turn lanes, 3 through lanes and a separate right-turn lane on all approaches), which may still result in LOS F conditions during the peak hour in 2020. Study other potential solutions to relieve this anticipated congestion.
   - Explore appropriate traffic management measures for arterial roadways to reduce speeds and limit increases in traffic volumes along Eureka Road.

- Monitor traffic volumes on Eureka Road and Douglas Boulevard and if additional roadway widen is necessary to maintain at least LOS E conditions, the widening of Douglas Boulevard to six lanes should be considered before a widening of Eureka Road to four lanes.

3) Potentially close some median openings along Douglas Boulevard at minor roadways and/or driveways and only allow right-turns due to safety concerns related to high volumes on Douglas Boulevard.

4) Eliminate Rocklin Road Extension from General Plan Circulation Element and Community Plan and provide selected improvements (shoulders and intersection turn lanes) to alternative routes. Also provide a new connection between Laird Road and Val Verdi Road.

5) Explore revised roadway cross-section (lane and shoulder width) standards for 2-lane arterial/collector roadways based on average speed and projected roadway volume (see potential standards on Table 6).

6) Set roadway width standard for local urban/suburban roadways to 28 - 32 feet of pavement (with width depending on traffic volume and parking demand) plus curb, gutter and sidewalks.

7) Provide urban roadway standard (with curb, gutter and sidewalk) on urban streets that are shared with other jurisdictions (such as Greenbrae Road and Aguilar Road).

8) Update the Capital Improvement Program and traffic impact fees for the study area.

Neighborhood Traffic Management (NTM)

1) Establish a comprehensive NTM Program for Placer County that includes:

   - NTM Policies.
   - A process and criteria for defining problems, selecting appropriate solutions, prioritizing and funding measures, and monitoring benefits/costs.

2) Based on technical analysis for two NTM "case studies" on Elmhurst Drive and Eureka Road, define and implement some phased solutions to traffic speed and volumes issues along these roadways.

3) Explore revised/narrower roadway cross-section standards for residential roadways based on the functional classification of the roadway and residential densities.

Bikeways

1) Modify Community Plans to include some desirable on-street and off-street bikeways.

- Change the proposed Class III bikeway on Eureka Road from Barton Road to Auburn-Folsom to proposed Class II bikeway.

- Link the proposed Class III bikeway on Laird Road from Wells Avenue north to the proposed Class II bikeway in Loomis with a Class III or II bikeway.

- Provide Class III or Class II bicycle access on Elmhurst Drive.

- Provide a link to the proposed Class I path along Linda Creek east of Sierra College Boulevard, which is being considered as part of a proposed development in eastern Roseville and is proposed to extend into Placer County.

2) Establish priority bikeway improvements.

3) Pursue funding to implement priority bikeway improvements.

8. Public Input

Two public open houses were held for the Southeast Placer County Transportation Study. The first open house was held at the Granite Bay Library on May 16, 2000, early in the study process. DKS had conducted some initial year 2020 travel demand forecasts for the study area and prepared some graphics related to existing and future traffic issue. The purpose of this meeting was to receive public comments on the important transportation issues for the study area and to request public input on solutions to those issues.

The second open house was held at the Eureka Elementary School on September 20, 2000. At that meeting, DKS presented a set of draft recommendations for the study and requested public comments on those recommendations. County staff also made presentations to the Newcastle/Ophir Municipal Advisory Committee (MAC) on April 20th and September 21st, to the Horseshoe Bar MAC on September 19th, and the Granite Bay MAC on April 5th and November 1st. County staff and DKS will make presentations to the Planning Commission on November 16th and the Board of Supervisors on December 5th.

This section summarizes the input received at the two open houses.

Comment cards were distributed at a public open house that was held on May 16, 2000. These cards asked the attendees to list transportation issues and suggested solutions. The following summarizes those comments as well as public input from some letters received by Placer County on this study.

Regional Traffic

Issues

There has been substantial growth in traffic traveling through the Granite Bay area between Roseville and Folsom. There are no facilities for through traffic, such as a beltway. New crossing of the American River in Folsom has greatly increased traffic.

Solutions

Work with Sacramento County to improve roadways (such as Oak Avenue) in Sacramento County that would accommodate through traffic between Roseville and Folsom. Do not widen any Placer County roads. Extend Rocklin Road to Auburn-Folsom Road. Need regional vanpool and / or transit solutions. Need a regional review of a beltway. Install tolls.

Bikeway and Pedestrian Facilities

Issues

On many roadways, there are inadequate facilities for pedestrians and bicyclists. Poor conditions on bike trails / lanes. Dangerous conditions at major intersections. Roadways specifically identified include:

- Barton Road

- Douglas Boulevard
- Eureka Road

Solutions

Add bike lanes. Reduce truck traffic. Provide bicycle trails for workers to travel between Roseville and Folsom. Extend Miners Ravine bike trail. Need traffic signal actuation for bicycles. Avoid overlays that end in middle of bike lane.

Roadway Improvements

Issues

Many roadways are in poor condition, with broken pavement and inadequate shoulders. Roadways are too congested. There is congestion around the Eureka School. Need improved access to the proposed Twin Schools Park. Auburn-Folsom Road is a scenic corridor. Roadways specifically identified include:

- Auburn-Folsom Road
- Eureka Road
- Joe Rodgers Road
- MacDuff Drive
- Oak Hill Drive
- Oak Leaf Way

Solutions

Repave roadways. Eliminate "humps" in vertical alignment. Straighten curves. Improve shoulders. Install traffic signals. Re-time traffic signals. Add center left-turn lanes. Widen roadways. Connect Twin Schools Road to Eureka Road. Widen Eureka Road. Establish weight limits.

Neighborhood Traffic

Issues

On many roadways, there is an excessive volume of traffic. There are many speeding vehicles. Conditions are unsafe for school buses and emergency vehicles. Through traffic "cuts through" neighborhoods. Roadways specifically identified include:

- Auburn-Folsom Road
- Barton Road
- Bentwood Way
- Cavitt-Stallman Road
- Chelshire Downs Road
- Elmhurst Drive
- Eureka Road
- Oak Hill Drive

- Olive Ranch Road
- Rolling Oaks Drive
- Sierra College Boulevard
- Swan Lake Drive
- Village Center Drive
- Wood Thrush Way

Solutions

Install stop signs. Reduce speed limits. Allow residents to set speed limits. Widen Douglas Boulevard and East Roseville Parkway to improve conditions on Eureka Road. Increase enforcement. Install raised pavement markers (dots) to highlight speed limit signs. Install horse crossings. Add speed undulations. Do not locate speed undulations immediately in front of homes. Minimize left turn lanes and traffic signals along Auburn-Folsom Road. Design intersections to not encourage through traffic. Limit commercial businesses in residential areas. Add other traffic calming devices.

Comments on Draft Study Recommendations

Comment cards were also distributed at a public open house that was held on September 20, 2000. These cards asked the attendees to comment on the draft study recommendations. The following summarizes those comments on the recommended improvements as well as others offered by the attendees.

Arterial/Collector Roadway Improvements

Many of the comments regarding arterials and collector roadway improvements focused on Eureka Road. These comments indicate that there is a wide gap of opinion between citizens who wish to limit / control traffic on Eureka Road and others who wish to widen the road to facilitate through travel.

Eureka Road

Shoulders and bike paths on Eureka Road are a good idea. Install speed bumps. Maintain the 40-mph speed limit. Was unhappy when speed limit was increased to 45-mph. Concerned about excessive speeds on Eureka. Increase speed enforcement. Use photo radar. Don't install any traffic signals. Cut-off through traffic at Sierra College Boulevard. Restrict through traffic. Place stop signs at Purdy Lane, Saddlespur Way, Eureka Elementary School, and Quartzite Circle. Limit truck size.

No extra stop signs should be placed along Eureka Road. Eureka Road should be widened to four lanes. Add north-south connections between Eureka Road and Douglas Boulevard.

Other Facilities

Widen Douglas Boulevard to six lanes while leaving Eureka Road as two lanes. Construct a traffic signal at Fuller Drive and Auburn-Folsom Road. Construct a bypass route along the Sacramento County line. Use the power line right-of-way to carry through traffic from Folsom to Roseville. Construct the Rocklin Road connector. Provide a median with landscaping (trees and grass) along Auburn-Folsom Road from Douglas Boulevard to Sacramento County. Widen Auburn-Folsom Road

to four lanes with bike lanes. Would like an exception to the LOS "C" policy so that roads in Granite Bay are not widened. Smooth out the curve on Santa Juanita Avenue. Close Barton Road at the county line.

Neighborhood Traffic Management

Close Folsom Lake Estates roadways to through traffic. Block off entrance to Folsom Lake Estates at Auburn-Folsom Road. Provide undulations and raised crosswalk intersections on Elmhurst Drive near schools and new park. Place a stop sign at Elmhurst Drive and Chelshire Downs Road. Include Folsom Lake Estates / Oak Hill Drive in the pilot NTM studies. Need traffic signals at all school entry points. Need sidewalks in Folsom Lake Estates. Make Folsom Lake Estates a gated community. Folsom Lake Estates needs speed bumps, sound barriers, no through traffic signs, reduced speed limits, and new paving. Consider peak period turning restrictions at Auburn-Folsom Road and Oak Hill Drive. Retime the traffic signal at Douglas Boulevard and Sierra College Boulevard.

Bikeways

Like to see bike paths separated by a curb, similar to Roseville Parkway. Bicycles need license plates so the traffic law violators can be reported. Like to see bikeways designed for kids. Need access to American River bikeway from all directions.

Study Issues

Show on graphics the assumptions on neighboring streets. Stop the study, and expand it to include air pollution, safety, other alternatives and neighboring community impacts. Initiate coordination with SACOG.

Other Issues

Construct access to Twin Schools Park through the high school. Build a commuter lane from the schools (Twin Schools) to Eureka Road. Provide additional ingress and egress to the "Woods" development. Bring light rail northeast to at least Rocklin.

Appendix A. Existing Bicycle Plans and Bikeway Planning Concepts

This appendix provides an overview of adopted bicycle plans in the study area and surrounding jurisdictions and outlines some basic concepts for bikeway planning that were used to evaluate bicycle needs in Southeast Placer County.

Local Bicycle Plans

The following cities have adopted bicycle plans: Folsom (1999) and Roseville (1994). In addition, the Town of Loomis' and the City of Rocklin's General Plan Circulation Elements contain policies related to bicycling and walking. Placer County's unincorporated communities of Auburn/Bowman, Granite Bay, and the Horseshoe Bar/Penryn areas contain bicycle and pedestrian policies in their respective Community Plan circulation elements.

Placer County Bikeways Master Plan (1988)

The Placer County Bikeway Master Plan was adopted in 1988 by the Placer County Transportation Commission (PCTC). With the goal of developing a comprehensive, safe and efficient network of bikeway facilities that fulfills both the recreation and transportation needs of Placer County residents, the Plan emphasizes the need for a bikeway system that takes advantage of Placer County's scenic qualities and appeals to the needs of various users groups, including the avid and weekend cyclist. Location and design criteria of proposed bikeway facilities, including standards for signage and traffic control devices, highlight the Plan's desire to ensure the safety of both motorists and bicyclists alike. The primary goal of the plan is to provide the Placer County Transportation Commission, cities, and County with a planning tool to make short- and long-range decisions for funding and construction of bicycle trails. The Plan provides the basis for funding and a priority schedule to meet the criteria for applying for Caltrans bicycle lane account funds.

City of Folsom Bikeway Master Plan (1999)

Located within the jurisdiction of Sacramento County, the City of Folsom abuts the study area along Placer County's southeast county boundary near the southern tip of Folsom Lake. The significance of this Plan to the study area are the connections provided by the American River Bikeway, a Class I Bike Path, and an existing Class II bike lane on Folsom - Auburn Road to the study area. Both are major commuter and recreational routes for bicyclists, while the American River Bikeway is recognized as one of the premier, regional off-road pathway systems in the United States.

City of Roseville Bicycle Master Plan (1994)

The City of Roseville's Bicycle Master Plan addresses the needs of both commuter and recreational cyclists while stressing the importance of regional connectivity.
Of these existing regional connections, two are relevant for the study area:

- Eureka Road, defined as a Class II regional connector, extends through the eastern area of Roseville into the study area, eventually linking to Auburn-Folsom Road.

- East Roseville Parkway, also a Class II Regional Connector in the eastern area of Roseville, provides linkages to potential recreation areas in the study area, such as the Granite Bay Golf Club.

There are several proposed Regional Connectors bearing significance to the study area in the Plan. The three proposed regional connections outside the city's eastern limit which link into Placer County include:

- Proposed Class I path along Miner's Ravine.
- Proposed Class I path along lower portion of Linda Creek.
- Proposed Class II bikeway on Douglas Boulevard.

Town of Loomis General Plan Circulation Element (1999) – Draft

The Draft circulation element in the Town of Loomis General Plan (1999) identifies two existing Class II bike lanes that may potentially have an impact on the Southeast Placer County Transportation Study area:

- Sierra College Boulevard between Granite Drive and Del Mar Avenue.
- King Road between Sierra College Boulevard and Interstate 80.

City of Rocklin General Plan (1991)

While there are no existing bike facilities identified in the City of Rocklin's General Plan Circulation element that are relevant towards the Study Area, the general plan maps proposed bike facilities which should be noted. As proposed, there would be:

- Class I bike path on Rocklin Road from Pacific Street extending east into Placer County.
- Class II bike lane along the length of Sierra College Boulevard through Rocklin, Loomis and portions of Placer County.

Auburn/Bowman Community Plan (1993)-Draft

The Traffic Circulation Element of the Auburn/Bowman Community Plan addresses needs of bicyclists. In terms of bicycling, the goals of the Community Plan are consistent with the goals of the Placer County Bikeways Master Plan; that is, to provide a safe community trail system parallel to public roadways that links to community centers and connects to regional trail systems in the County, with the exception of providing separated trails in the community plan area. Separated trails are not provided for in Placer's Bikeways Master Plan. Compared to the Master Plan, the Community Plan proposes more bikeway facilities and has upgraded its standards for these facilities compared to the standards in the Placer County Bikeways Master Plan.

Granite Bay Community Plan (1989)

The Granite Bay Community Plan establishes a set of policies to provide a safe, pleasant, and convenient community trail system for bicycles that serve the needs of local residents while indicating the need for inter-community travel via a regional trail network to facilitate travel between communities and provide access to state and county parks. The plan seeks, among other things, to enhance the community's rural atmosphere.

Sections of a separated bike trail currently exist along Douglas Boulevard, providing a continuous trail from the Folsom Lake State Recreation Area almost to Auburn-Folsom Road. The Plan indicates that other isolated sections of separated trail exist which should become part of an ultimate trail network.

Proposed facilities indicated in the Community Plan include:

- Class I Douglas Boulevard (from Sierra College to Folsom lake), Rocklin Road with extension and Strap Ravine Route (from Sierra College Boulevard to Barton Road).
- Class II Auburn-Folsom Road, Barton Road, Douglas Boulevard (from Sierra College to Folsom lake), Eureka Road, Laird Road, and Old Auburn Road (from Sierra College to Cirby Way).
- Class III Joe Rodgers Road, Olive Ranch Road, Seeno Avenue to Briar Way and Oak Hill Drive.

Horseshoe Bar/Penryn Community Plan (1994)

The Horseshoe Bar/Penryn Community Plan shares similar goals and policies for bikeways as the Granite Bay Community Plan, expressing the need to develop a multiple use trail and bikeway system for residents and visitors of the Community Plan area that serve the needs of both recreational-including equestrian-and transportation users. The local trails are an important component of the community and should link to regional trails as well as major residential areas and areas of horse populations, employment centers, park and recreation areas, schools, and major waterways and vista locations.

The Secret Ravine Riparian Corridor has been selected as an area for potential development for additional unpaved, multiple use trails linking up to the Penryn Parkway and Loomis Basin Community Park and the nature trail at Sierra College to the south. Moreover, the potential for multiple use trails along the length of King Road, from Barton Road along the length of Secret Ravine, and along roadways shown on the Community Plan's Recreation Facilities Map are also being studied.

There is currently only one signed and striped bikeway within the Community Plan area. This is a Class III bikeway located along Auburn-Folsom Road between King Road and Shirland Tract Road.

The following are proposed on-street bikeways identified in the Community Plans that are in the Southeast Placer County Transportation study area:

- Class II King Road from I-80 to Sugar Loaf Mountain Road, Horseshoe Bar Road from Town of Loomis to Auburn-Folsom Road, Sierra College Boulevard from Loomis Town Limit to Community Plan boundary, and from I-80 to Rocklin Road.
- Class III Auburn-Folsom Road from Dick Cook to Shirland Tract Road, King Road from Sugar Loaf Mountain Road to Auburn-Folsom Road, Horseshoe Bar Road from Auburn-Folsom Road to Folsom Lake State Recreation Area, Penryn Road from Taylor Road to King Road, Rock Springs Road from Auburn-Folsom to Taylor, Newcastle Road from Rattlesnake Bar Road to Community Plan Boundary, Rattlesnake Bar Road from Shirland Tract to Folsom State Recreation Area, Val Verde Road from King Road to Dick Cook.

Differences between Commuter and Recreational Bicycle Needs

The purpose of reviewing the different needs of recreational and commuter bicyclists is twofold: (a) it is instrumental when planning a system which must serve both user groups and (b) it is useful when pursuing competitive funding and attempting to quantify future usage and benefits to justify expenditures of resources. According to a May 1991 Lou Harris Poll, it was reported that *"...nearly 3 million adults--about one in 60--already commute by bike. This number could rise to 35 million if more bicycle friendly transportation systems existed."* In short, there is a large reservoir of potential bicyclists in Placer County who don't ride (or ride more often) simply because they do not feel comfortable using the existing street system and/or don't have appropriate bicycle facilities at their destination.

Key general observations about bicycling needs in Placer County include:

- **Bicyclists are typically separated between experienced and casual riders.** The U.S. Department of Transportation identifies thresholds of traffic volumes, speeds, and curb lanes where less experienced bicyclists begin to feel uncomfortable. For example, on an arterial with traffic moving between 30 and 40 miles per hour, less experienced bicyclists require bike lanes while more experienced bicyclists require a 14 or 15 foot wide curb lane.
- **Casual riders include those who feel less comfortable negotiating traffic.** Others such as children and the elderly may have difficulty gauging traffic, responding to changing conditions, or moving rapidly enough to clear intersections. Other bicyclists, experienced or not, may be willing to sacrifice time by avoiding heavily traveled arterials and using quieter side streets. In some cases, casual riders may perceive side streets (or sidewalks) as being safer alternatives than major through routes, when in fact they may be less safe. Other attributes of the casual bicyclist include shorter distances than the experienced rider and unfamiliarity with many of the rules of the road.
- The casual bicyclist will benefit from route markers, bike lanes, wide curb lanes, and educational programs. Casual bicyclists may also benefit from marked routes that lead to parks, museums, historic districts, and other visitor destinations.
- **Experienced bicyclists include those who prefer the most direct, through route between origin and destination, and a preference for riding within or near the**

travel lanes. Experienced bicyclists negotiate streets in much the same manner as motor vehicles, merging across traffic to make left turns, and avoiding bike lanes and shoulders that contain gravel and glass. The experienced bicyclist will benefit from wide curb lanes and loop detectors at signals. The experienced bicyclist who is primarily interested in exercise will benefit from loop routes, which lead back to the point of origin.

- **Bicycles themselves range in cost from about $350 to over $2,000 for adult models.** The most popular bicycle type today is the hybrid mountain bike or BMX. These relatively lightweight bicycles feature wider knobby tires that can handle both on-road and off-road conditions, from 10 to 27 gears, and up-right handlebars. Advanced versions have features such as front and rear shock absorbers to help steady the rider on rough terrain. The 10-speed of years past has evolved into a sophisticated ultra-light 'road bicycle' that is used primarily by serious long distance adult bicyclists. These expensive machines feature very narrow tires that are more susceptible to flats and blowouts from debris on the roadway.
- **Who rides bicycles?** While the majority of Americans (and Placer County residents) own bicycles, most of these people are recreational riders who ride relatively infrequently. School children between the ages of about 7 and 12 make up a large percentage of the bicycle riders today, often riding to school, parks, or other local destinations on a daily basis weather permitting. The serious adult road bicyclist who may compete in races, 'centuries' (100 mile tours) and/or ride for exercise makes up a small but important segment of bikeway users, along with serious off-road mountain bicyclists who enjoy riding on trails and dirt roads. The single biggest adult group of bicyclists in Placer County is the intermittent recreational rider who generally prefers to ride on pathways or quiet side streets.

Bicycle Commuter Needs

Commuter bicyclists in Placer County range from employees who ride to work to a child who rides to school. Bicycling requires shorter commutes, which runs counter to most land use and transportation policies that encourage people to live farther and farther from where they work. Access to transit helps extend the commute range of cyclists, but transit systems also face an increasingly dispersed live-work pattern that is difficult to serve. Despite these facts, Placer County has a great potential to increase the number of people who ride to work or school because of (a) the presence of inter-modal transit connections that allow bicycles on board thereby extending viable commute distances for the average rider, (b) moderate density residential neighborhoods with quiet side streets leading to commercial and employment centers, and (c) a mild climate that is favorable throughout most of the year.

Key bicycle commuter needs in Placer County are summarized below.

- Commuter bicyclists typically fall into one of two categories: (1) adult employees, and (2) younger students (typically ages 7-15).
- Commuter trips range from several blocks to 1 or more miles.

- Commuters typically seek the most direct and fastest route available, with regular adult commuters often preferring to ride on arterials rather than side streets.
- Commute periods typically coincide with peak traffic volumes and congestion, increasing the exposure to potential conflicts with vehicles.
- Places to safely store bicycles is of paramount importance to all bicycle commuters.
- Major commuter concerns include changes in weather (rain), riding in darkness, personal safety and security.
- Rather than be directed to side streets, most commuting adult cyclists would prefer to be given bike lanes or wider curb lanes on direct routes.
- Unprotected crosswalks and intersections (no stop sign or signal control) in general are the primary concerns of all bicycle commuters.
- Commuters generally prefer routes where they are required to stop as few times as possible, thereby minimizing delay.
- Many younger students (ages 7-11) use sidewalks for riding to schools or parks, which is legal in many areas, often where pedestrian volumes are low and driveway visibility is high. Where on-street parking and/or landscaping obscures visibility, sidewalk riders may be exposed to a higher incidence of accidents. Students 12 years or older who consistently ride at speeds over 5 mph should be directed to riding on-street wherever possible.
- Students riding the wrong-way on-street are common and account for the greatest number of recorded accidents in California, pointing to the need for safety education.

Recreational Needs

The needs of recreational bicyclists in Placer County must be understood prior to developing a system or set of improvements. While it is not possible to serve every neighborhood street and every need, a good plan will integrate recreational needs to the extent possible. The following points summarize recreational needs:

- Recreational bicycling in Placer County typically falls into one of three categories: (1) exercise, (2) non-work destination such as a park or shopping, or (3) touring.
- Recreational users range from healthy adults to children to senior citizens. Each group has their own abilities, interests, and needs.
- Directness of route is typically less important than routes with less traffic conflicts. Visual interest, shade, protection from wind, moderate gradients, or other features are more important.

People exercising or touring often (though not always) prefer a loop route rather than having to back-track.

Appendix B. Example Multi-Phase NTM Process

The following example process for assessing neighborhood traffic issues is based on several NTM programs in Oregon and California. It includes several steps and decisions to assure the best projects are developed for the County.

Step 1. Identification of a Neighborhood Problem: This can occur several ways, from a resident's individual concerns, to a neighborhood association issue, to a matter identified by County staff (maintenance, engineering or planning), to an issue of concern to a business[2].

Step 2. Level I Action Plan: Once a problem has been presented by the neighborhood association to the County, the first step will be to address education and enforcement related to NTM measures. To be eligible for this step, the project must be a two-lane street that has residential zoning or institutional uses (schools, hospitals, fire stations, and parks) for at least 75 percent of the fronting properties. This first step is taken to address concerns immediately without substantial cost in analysis. Educational-related programs can include the following:

- Door-to-door distribution of brochures in a neighborhood,
- Public awareness including placing announcements in neighborhood association newsletters defining the "hot spot",
- Neighborhood speed watch program (both for the education of the neighbors and for the distribution of letters of concern to speeding drivers),
- Having county staff (police and/or public works) make presentations to neighborhood groups to inform them of NTM, temporary yard signs.

Neighborhood volunteers would undertake most of these educational efforts. Enforcement efforts could include scheduling placement of the speed reader board trailer, requests for increased enforcement at problem areas and linking enforcement and reader board placement.

Step 3. Analysis to Define the Problem: Following implementation of a Level 1 action plan, residents working together with the County staff, the neighborhood association will determine if further actions are necessary. If further action is needed, the County will conduct field reconnaissance and analysis to provide quantitative background regarding the street of concern.

A data check list will be prepared that may include a 24-hour count of the traffic volume and speed, street width, presence of sidewalks, fronting land uses, location of schools or special activity centers (parks, senior housing, retail centers, major employment, institutional uses within 1,000 feet), general assessment of pavement condition and grade, on-street parking, functional classification identification, sight distance issues and fronting land uses and driveways. This information will be used to do two assessments: 1) determine if threshold criteria are met for consideration of Level 2 NTM; or 2) if Level 2 thresholds are not met, what additional Level 1 measures should be considered.

[2] It is important to note that many citizen concerns related to traffic and transportation do not fall within the purview of NTM. These include requests for installation or changes to traffic control devices, on-street parking issues, and requests for turn lanes, street light and street maintenance. These issues are-and will continue to be handled though the County's established process.

County staff will make the determination of whether Level 2 consideration is warranted. An example of the thresholds for Level 2 consideration is shown in Table B-1:

Table B-1
Potential Thresholds for Level 2

Functional Class	Speed	Volume	Fronting Land Use
Local Street	Median speed > 28 to 33 mph	750 vpd	> 75% residential and institutional (including parks)
Collector Street	Median speed ≥ Posted speed	None	> 75% residential and institutional (including parks)
Arterial Street	Median speed ≥ Posted speed	None	> 75% residential and institutional (including parks)

For projects that do not meet the adopted thresholds, other considerations in addition to Level 1 could include: arterial traffic signal timing enhancements, low cost arterial operational improvements (TSM), signing, striping, on-street parking, rumble strips (using raised pavement markers), through commercial vehicle restrictions, stop signs (if warranted), turning restrictions (low cost medians), lighting and/or high visibility crosswalks (where appropriate). The operational enhancements to arterials are aimed at potential project sites where poor operation on arterials results in some cut through traffic.

Step 4. Level 2 Prioritization: After meeting the Step 3 thresholds, the next step will be to prioritize the proposed NTM project. The reason for prioritizing the problem prior to developing solutions is to assure that staff, public and design efforts are expended where the greatest needs exist. A scoring system can be developed to assist with the prioritization process. Once the County staff completes the ranking process, the project list will be entered into the County's Capital Improvement Program (CIP) process for funding and implementation.

Table B-2 shows an example of criteria, measures, thresholds and a point system that could be used in a prioritization process. Separate scoring systems are provided for each functional classification.

An example of a scoring system by functional classification is shown below in Tables B-3, B-4 and B-5. In other communities, a Citizens Advisory Committee ranked the criteria. County staff would be responsible for ranking projects between functional classifications (e.g. arterial projects with collector projects with neighborhood projects). A project list will be forwarded to the CIP process. Projects that meet the threshold criteria and for which there is a private commitment to fund the NTM project will be given additional points as specified in the criteria. This additional scoring is intended to leverage public funds for NTM to get the maximum benefit for the public investment.

Table B-2
Example of Potential Measures and Scoring

Criteria	Measure (s)
Volume	2000 vpd as a threshold. Point totals for each 100 vpd over, say a 500 vpd base.
Speed	32 mph threshold. Point totals for each mph over 25 mph; multiple points over 28 mph/33 mph.
Pedestrians	Presence of sidewalks (yes/no) with a point score. Pedestrian volume is costly to obtain and may not be valuable.
Street Classification	This could be complex. Functional Class may be used to dictate types of NTM measures or preclude them entirely. This could be a yes/no measure with scoring.
Amount of Cut Through Traffic	200 Vehicles per Day or 30 to 60 percent. Points for each unit above the base threshold.
Impacts to Emergency Route	This would be a Yes/No measure with point scoring. If the delay approach were used, total delay times and thresholds would need to be established.
Amount of Traffic Diversion	100 to 200 vehicles per day may define an impact, but not whether NTM appropriate. This may be used as an evaluation measure.
Cost	Dollars. A threshold could be established, but it will likely be stipulated by budgeting.
Key Land Use	Points for selected land uses within 500 feet (or one block as an alternate. Uses include park, retail center, activity center, etc.
Pavement Condition	Points allocated to rating of Good/Fair/Poor/Bad from PMS
Residential Acceptance	Minimum 50% support for plan. May be best used as a threshold.
School Zone	Points for schools (public, private, colleges) within 500 feet or one block as an alternate.
Bus/Truck Route	Points for if route is a bus, truck or school bus route.

Table B-3
Example Local Street Project Prioritization Scoring Process

Criteria	Maximum Points	Basis for Scoring
Speed	40	(85^{th} percentile speed – posted speed) x 3 points.
Volume	25	4 points for every 100 vehicles per day over 600 vpd.
Transit or School Bus Route	5	5 points if the street is on a transit or school bus route.
Pedestrian Generators	10	10 points if within 500 feet of street there are pedestrian generators (parks, elderly housing, retail commercial uses, high school, college or hospital).
Sidewalks	5	5 points if no sidewalks in project area are discontinuous on both sides.
Partial Private Funding	5	1 point for every 20 % of project funding.
School	10	10 points if an elementary or middle school (public or private is within 500 feet of the project street.
TOTAL SCORE	***100***	

Table B-4 **Example Collector Street Project Prioritization Scoring Process**		
Criteria	Maximum Points	Basis for Scoring
Speed	40	(85^{th} percentile speed – posted speed) x 3 points.
Volume	10	1 points for every 1000 vehicles per day.
Transit or School Bus Route	5	5 points if the street is on a transit or school bus route.
Pedestrian Generators	15	15 points if within 500 feet of street there are pedestrian generators (parks, elderly housing, retail commercial uses, high school, college or hospital).
Sidewalks	10	10 points if no sidewalks in project area are discontinuous on both sides.
Partial Private Funding	5	1 point for every 20 % of project funding.
School	15	15 points if an elementary or middle school (public or private is within 500 feet of the project street.
TOTAL SCORE	***100***	

Table B-5 **Example Arterial Street Project Prioritization Scoring Process**		
Criteria	Maximum Points	Basis for Scoring
Speed	20	(85^{th} percentile speed - posted speed) x 2 points.
Volume	10	1 points for every 1000 vehicles per day.
Transit or School Bus Route	10	10 points if the street is on a transit or school bus route.
Pedestrian Generators	15	15 points if within 500 feet of street there are pedestrian generators (parks, elderly housing, retail commercial uses, high school, college or hospital).
Sidewalks	15	15 points if no sidewalks in project area are discontinuous on both sides.
Partial Private Funding	5	1 point for every 20 % of project funding.
School	15	15 points if an elementary or middle school (public or private is within 500 feet of the project street.
TOTAL SCORE	***100***	

Step 5. Level 2 Project Development: Using the CIP process for transportation projects in the County, those projects within two years of construction will go into project development. This step involves extensive public involvement through the neighborhood associations and project

subcommittees involving the County staff. A NTM toolbox can be developed for Placer County with public input to provide a standard set of measures that could be uniformly applied through the County. Table B-6 shows an example of a toolbox from other communities. Using measures from the toolbox, each project subcommittee will identify appropriate measures for use in the project. Design standards will guide the selection and placement of NTM measures. Measures specific to the functional class of street will be considered. At the end of this step the NTM project will have community support for the final design and have been presented to the public before gaining administrative approval of the Public Works Department.

Table B-6
Example of NTM Tool Box

Local	Collector	Arterial
Chicane Choker Circle Diverter Pavement Texture Speed Hump On-street parking One way entry/exit Truck Restrictions Turn Restrictions Street Trees	Pavement Texture On-street parking One way entry/exit Truck Restrictions Turn Restrictions Medians Curb Extensions Roundabouts Street Trees	Medians Curb Extensions Streets Trees
For New Construction (not retrofit), also Consider		
Local	Collector	Arterial
Connected Curvilinear Street Medians Narrow Street Street Grid Shared Space		

An evaluation of the selected measures would include the following:

- Potential diversion. Potential for diversion of traffic to adjacent streets will be estimated for the project. If diversion of over 300 vehicles per day is anticipated to another neighborhood or local street, residents from that street will be required to be added to the NTM petition form. Diversion to arterials or collectors will not be considered an impact.
- Impact to Emergency Routes. Obstruction measures (such as speed humps or traffic circles) will not be allowed on routes designated by the fire and police departments as primary response routes.
- Multi-modal Access. Bicycle and pedestrian access will not be negatively impacted, and transit access will not be prevented by the NTM project.
- Visual/Aesthetic Concerns. Samples of the visual character of the NTM measures selected will be reviewed in the public process.

- Maintenance. The effect of the NTM program on maintenance will be identified. This includes added costs for NTM measure maintenance (street sweeping, structural repairs, landscaping, etc.) and impact to maintenance activities.
- Desired Effect. The selected measure should produce the speed and/or volume benefit desired.

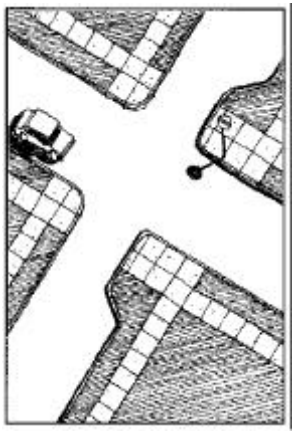
Step 6. CIP Implementation/Funding: Projects that have completed step 5 will be advanced for full funding and implementation. As identified in step 4, the highest rated group of projects will be forwarded to the CIP for funding.

Step 7. Monitoring: Once an NTM project is completed, data collection will be conducted approximately six to 12 months after completion to determine effectiveness and whether further refinements to the plan are required. Volume and speed data will be collected and summarized in a Before and After Report by County staff. If refinements are necessary, they will be identified following analysis of before/after data.

Appendix C. Sample Neighborhood Traffic Management Measures

Sample Neighborhood Traffic Management Measures

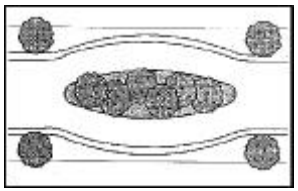
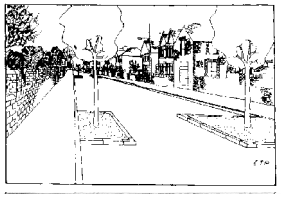
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Chicane		Channelization or curb extension that realign the straight path of a street, deflection straight vehicle movement.	Speed reduction (3 - 4 MPH) Low volume reduction and diversion	Up to $20,000
Choker (curb extension)		A roadway narrowing. This could be a curb extension at an **intersection** (also called bulb outs, neckdowns and throating) to reduce the roadway width at a selected location.	Speed reduction (3.3 MPH) Moderate volume reduction and diversion	Up to $20,000

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

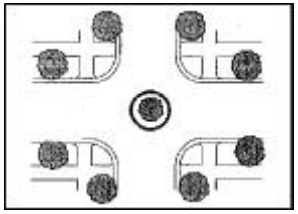
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Choker (median)		A roadway narrowing. With a median, the narrowing of the roadway comes from placing an island in the middle of the road. Some cities have used large raised pavement markers on the centerline at intersections to reduce speed of turning traffic. Medians can also be used for pedestrian refuge and/or access control to restrict turning movements. For access control it is important that medians are long enough to effectively create right-in/right-out restriction.	Speed reduction (3.3 MPH) Moderate volume reduction and diversion	Up to $20,000
Choker (pinch point)		A roadway narrowing . Curb lines are extended into the street area (usually landscaped islands or pedestrian extensions) to narrow the roadway.	Speed reduction (3.3 MPH) Moderate volume reduction and diversion	Up to $20,000

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

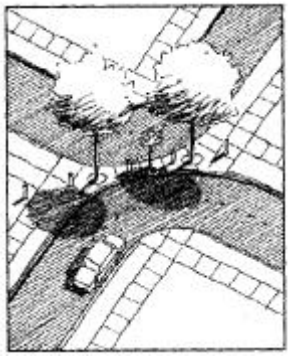
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Circles		A round island in the middle of an intersection	Speed reduction (5.7 MPH), Low volume reduction and diversion	Up to $20,000
Curvelinear		Similar to a chicane but over a longer distance or segment of street. Typically reversing curves designed to 25 MPH speed. Still provides direct connectivity with little out of direction travel.	Speed reduction (similar to chicane) Low volume reduction	Generally designed into original plans.

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

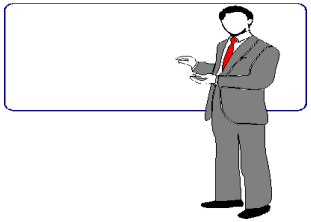
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Diverters		Channelization or islands that restricts movements at an intersection. Typically, allows right turns, not through traffic. There are full and partial diverters depending upon the number of movements restricted or diverted at an intersection.	Minor speed reduction (0.4 MPH) High volume reduction, high diversion impact	Up to $100,000
Enforcement (selective)		Police issuing tickets to vehicles violating speed zones. Can be effectively combined with other NTM elements such as education, public awareness, speed trailer and signs/banners.	Minor speed reduction documented (2 MPH)	Redirects enforcement resources from other policing activities

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

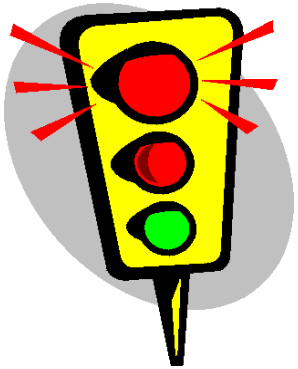
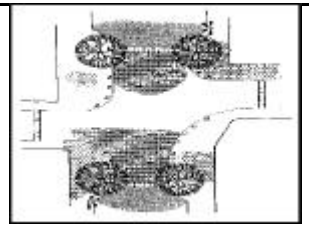
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Enforcement (automated)		Use of photo or video enforcement to ticket violators of speed zones. Also red light running photo enforcement is being developed.	Speed reduction (limited data)	Revenue from tickets can pay for system (depending upon fund allocation). Portland's system does not pay for itself.
Education		Providing training in drivers education, courses for ticketed drivers, mailings (handouts/flyers), public service advertisements	No data on results	$2,000 to $50,000/year

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

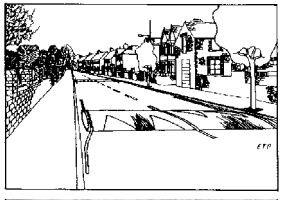
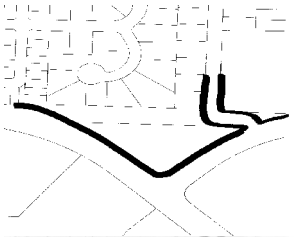
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Enhance Arterial and Collector Performance/ Coordinate Signal Timing		Providing adequate capacity, spacing and connectivity for arterials and collectors allow longer trips to stay on these facilities and not on neighborhood routes. Coordinated traffic signals can also be effective in keeping through traffic on arterials. In some cases, coordinated signal timing can reduce the amount of green signal time given to side streets. While this can be viewed as an impact to some, it can deter cut through traffic.	Speed reduction can be moderate - mostly due to removing faster traveling through moving traffic from neighborhood routes. Can significantly reduce volume where congestion exists.	Street Improvements are VERY expensive Typically not considered NTM projects
Entry Treatments		Generally use of landscaping and architectural elements at the roadway entrance to a neighborhood. Can include curb extensions and pavement texturing.	Similar to chokers	Up to $25,000

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

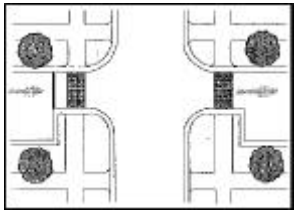
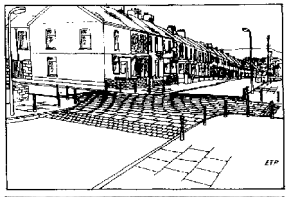
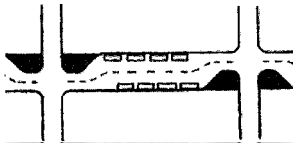
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Humps		Raising of pavement surface about 3" over about 10 to 20 feet (an undulation). Similar to this measure are speed tables, raised pedestrian crossings and raised intersections.	Speed reduction (7 MPH) Low volume reduction or diversion	Up to $5,000
Intersection Realignments/ Route Modification		Takes a standard 3 or 4 leg intersection and skews it to deflect traffic while maintaining safe design characteristics. Modify a route to make it less direct.	Similar to Circles	Depends on length of alignment.

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
One Way Streets		Takes the entry to a neighborhood area and makes the access road one way (typically out). Similar in some respects to a diverter. Can be used in connection with entry treatments.	Speed reduction (no data) Significant volume reduction and diversion	Up to $30,000
Pavement Texture **Pavement Markings**		Instead of smooth pavement surface, create roughness by using raised markers, pavers, colored concrete with patterns. Can be used to emphasize pedestrian crossing location. Sometimes paint is used to create channelization or narrowing.	Limited speed reduction Limited volume change Increases driver awareness of changed conditions (entering a neighborhood or pedestrian zone).	Depends on materials and square footage.
Parking On-street		Many streets less than 32' do not allow parking on one or both sides. By allowing parking, the traveled way is narrowed. Speeds must be slow for safe sight distance.	Speed reduction Limited volume reduction.	$0 - $1,000

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

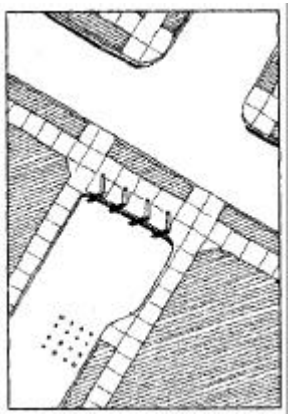
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Part Time Restrictions (PTR)		Use signs to limit vehicle movements during key times (typically school times or peak hours). Can be turn restriction, truck restrictions, through traffic restrictions, etc... Very difficult and expensive to enforce and can have high violation rates.	Moderate speed reduction (if through traffic removed) Moderate volume reduction (if restrictions enforced).	$500 - $5000
Public Awareness/Traffic Watch		Campaigns typically organized by agency to involve neighbors. Speed watch can include neighbors using a radar speed measuring device to identify speeders who receive a standard letter. Public awareness can include education activities, but also banners, newsletters, yard signs, web page material, neighborhood organization activities, etc...	Speed reduction (limited data)	$1,000 to $30,000 per year

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

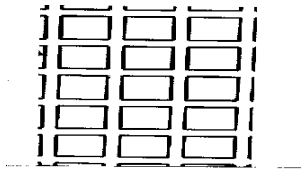
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Road Closure		Uses islands or barricades to close the end of a street. Creates a cul-de-sac for vehicles, pedestrians and bicycles can go through. Contrary to TPR emphasis on connectivity.	Speed reduction limited to site of closure. Significant volume reduction and diversion.	Up to $100,000
Shared Space		A European concept where there are no curbs in the roadway right-of-way. The road area is share among various users, using bollards, chokers and landscape elements to help define vehicle areas.	Speed reduction Significant volume reduction and diversion.	$10,000 - $50,000

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

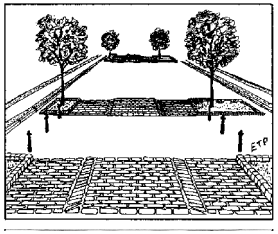
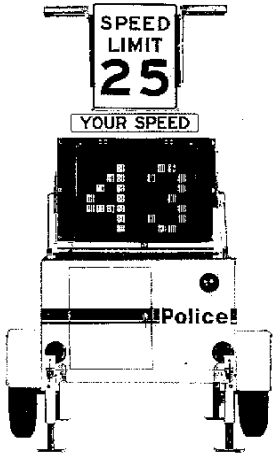
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Short Block Spacing		Shorter blocks create more streets with traffic distributed over more streets. The intersections created may require stop signs where warranted.	Limited speed reduction Significant volume reduction if done area wide	Typically part of original design and plans.
Signs		In the past "Slow Children" signs have been used. Yard signs have more recently been used (typically used as part of a public awareness or education program. Possible yard sign idea could include progressing signs that say 1) Did you Know, 2) That your Neighbors think, 3) You drive TOO FAST.	Speed reduction, however, the effectiveness (if any) diminishes (no data substantiating a benefit)	$50 - $500

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Speed Cushions		A European device similar to a speed hump, but narrower to allow buses or emergency vehicles with larger wheel bases to pass over without impact.	Speed reduction Little volume reduction	Up to $3,000
Speed Trailer		A trailer unit with a reader board that indicates the approaching vehicle speeds. Portable and can be moved from site to site. Can be reinforced with actual police enforcement on a selective basis.	Speed reduction (4.2 MPH) however, reduction occurs only when trailer is present. No volume reduction.	$10,000 - $25,000 + labor

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

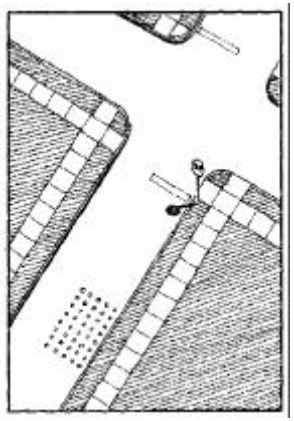
(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Speed Zone Changes		Speed zones in California are set by State Law. Typically, for collector and arterial streets, the 85th percentile speed is used as a guide. Past studies have proven that unrealistically low speed zones are ignored by drivers.	Little speed or volume change (without enforcement)	$20,000 (for signs and studies)
Street Narrowing		Different from chokers in that this would narrow an entire street rather than a point in the street. Street widths between 22 and 32 feet have been considered and used in some cities for specific applications.	Speed reduction (4.5 MPH) Low volume reduction or diversion	Typically done at construction of street or with reconstruction

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Sample Neighborhood Traffic Management Measures

(Most measures are appropriate for local streets, not collector or arterial roadways.)

Measure	Sample	What is it?	What does it do?	How much does it cost?
Stop Signs		Typically placed at intersections. Warrants determined by MUTCD. Significant research on unwarranted stop signs and their negative impact. MUTCD specifically indicates stop signs are not to be used for speed control. The volume warrant is for 500 vehicles entering the intersections for each of 8 hours.	Mixed findings on speed reduction (some up some down) Low volume reduction and diversion A device for traffic control and safety, generally not NTM	$250 - $2,500 (including studies, staff time and installation)
Truck Restrictions		No truck signs are posted at key cut through routes affecting through truck trips not local truck trips.	No speed reduction Significant truck volume reduction (if enforced)	$ 250 - $1,000

Source for graphics: *Traffic Calming,* American Planning Association, Planning Advisory Service, Report Number 456, July 1995.
Handbook for Walkable Communities, Burden & Wallwork.

Note: Significant additional costs may be needed for planning studies, public involvement, landscaping and architecture factors to implement the various NTM measures.

Appendix D. NTM Case Studies for Eureka Road and Elmhurst Drive

Introduction

As part of the *Southeast Placer County Transportation Study*, DKS Associates has been asked to conduct two Neighborhood Traffic Management (NTM) "case studies". The two residential roadways, Eureka Road and Elmhurst Drive, were selected by the Placer County staff and their draft selection was presented at the public open house on September 20, 2000 for comment before these case studies were conducted.

These case studies provide a technical basis for identifying the traffic problems on these residential streets, and outlining some of the pros and cons of potential solutions. This type of technical analysis would only be part of a comprehensive NTM process, as described in Section 6 and Appendix B of this report. A comprehensive NTM process would have additional mechanisms to involve the residents along these streets, as well as emergency service providers (police, fire and ambulance) who might be impacted by proposed NTM measures. A comprehensive process would also involve a phased implementation process, starting with low cost and easy to implement measures.

Thus a comprehensive process ensures that there is adequate input from all stakeholders and low cost and impact measures are considered first. These case studies simply show how the technical study for a NTM process can be used to identify the magnitude of traffic problems and point to appropriate solutions.

Eureka Road

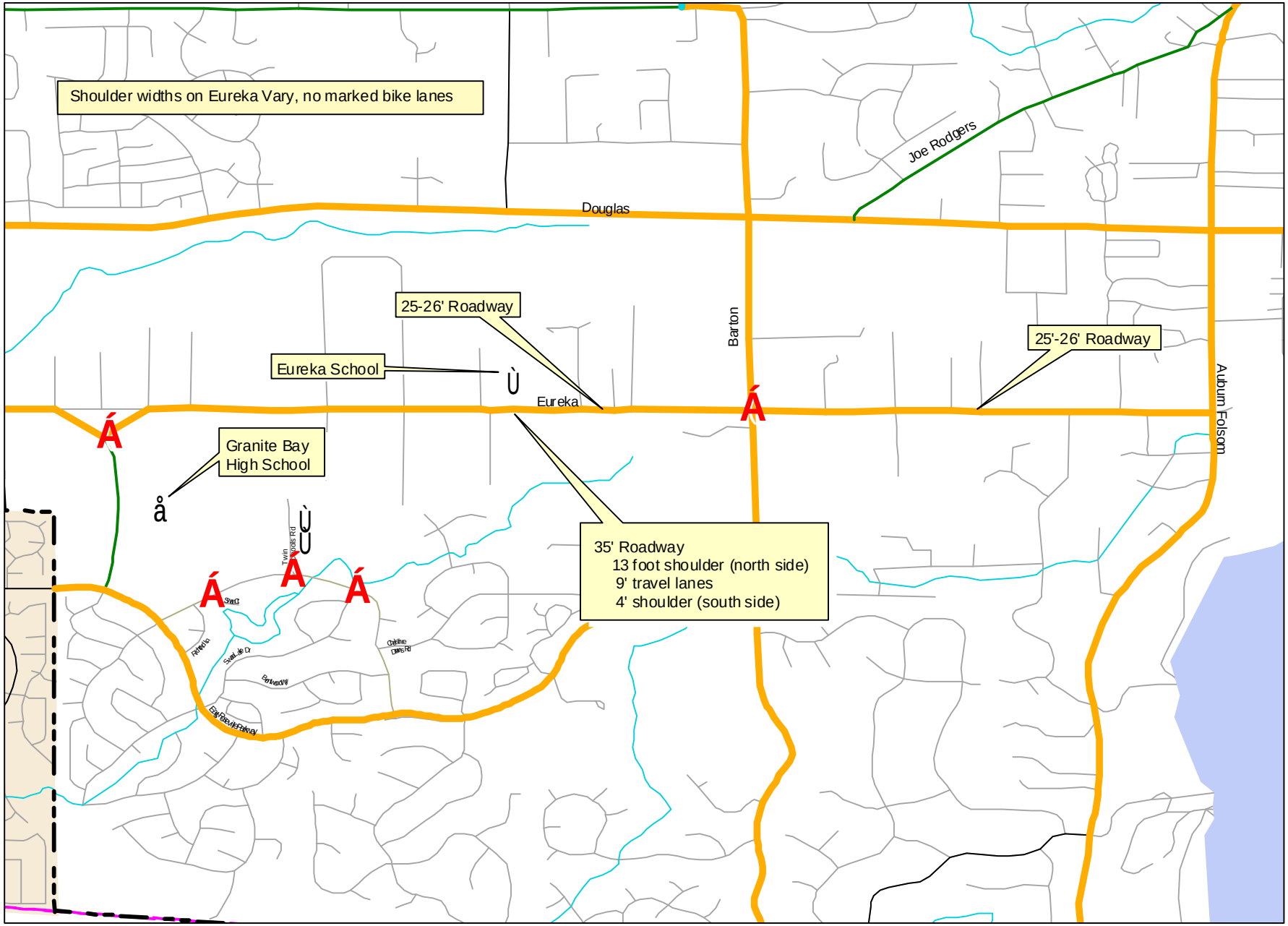
Eureka Road extends from Auburn-Folsom Road in Granite Bay to I-80 in Roseville. It is classified as an arterial roadway in both the Placer County General Plan and the City of Roseville General Plan. The section of Eureka Road from Auburn-Folsom Road to Wellington was selected as an NTM case study. Figure D-1 shows some of the relevant information about this section of roadway.

Roadway Geometry and Traffic Control

The study section of Eureka Road is about 2.5 miles long and was divided into four segments for this case study. These segments and their cross-sections are as follows:

- Auburn-Folsom Road to Barton Road – has about 25 to 26 feet of pavement and 9 to 10 foot wide travel lanes. The narrow shoulders have an inconsistent width ranging from 2 to 5 feet.
- Barton Road to the Eureka Elementary School 25 mph zone – has about 25 to 26 feet of pavement and 9 to 10 foot wide travel lanes. The narrow shoulders have an inconsistent width ranging from 2 to 5 feet.
- The Eureka Elementary School 25 mph zone – has about 35 feet of pavement, with 9 foot travel lanes, a 4 foot shoulder on the south side and a 13 foot school drop-off area on the north side adjacent to the school.

Figure D-1: Eureka Road NTM Case Study Area



- The Eureka Elementary School 25 mph zone to Wellington – has about 25 to 26 feet of pavement and 9 to 10 foot wide travel lanes for most of this segment. Some of this section has a bike lane only on the south side of Eureka Road, near Wellington, there is about 32 feet of pavement with bike lanes on both sides of the roadway.

The roadway has some modest hills along that somewhat restrict sight distances but much of this roadway is generally level.

A short multi-purpose trail is located along Eureka Road near Wellington. Otherwise, there are no sidewalks or off-street paths/trails along Eureka Road. Eureka Road is a designated bikeway on the Granite Bay Community Plan and the County intends to eventually provide Class II on-street bike lanes along Eureka Road from Auburn-Folsom Road to Wellington.

There is a traffic signal at the Eureka Road/Auburn-Folsom Road intersection, a four-way stop at the Eureka Road/Barton Road intersection and a three-way stop at Eureka Road/Wellington intersection. The remainder of the intersections along this section of Eureka Road are controlled with stop signs on the side streets.

The four-way stop at the Eureka Road/Barton Road intersection will warrant a traffic signal well before 2020 based on future traffic projections.

Existing and Future Traffic Volumes

Eureka Road carries 4,900 daily vehicle trips between Auburn-Folsom Road to Barton Road and 4,200 daily vehicle trips between Barton Road and Wellington. As shown in Figures 5 through 8 (see Section 3 of this report), the projected 2020 traffic volume on Eureka Road west of Barton Road would vary between 9,000 and 13,000 depending on the number of travel lanes on Eureka Road and Douglas Boulevard.

As indicated in Section 2 of this report, just over half of the vehicles on Auburn-Folsom Road at the County line had one end of their trip within the study area (i.e. within Granite Bay or the Horseshoe Bar communities). The other half is “through traffic”. By 2020, the amount of through traffic on that section of roadway is expected to increase of 190 percent. Local study area traffic using Auburn-Folsom Road at the County line is expected to increase by only about 23 percent. Thus, much of the growth in traffic in Granite Bay will stem from through travel.

To estimate the amount of through traffic now using Eureka Road, a license plate survey of vehicles traveling along Eureka was conducted during the afternoon peak commute period (4 PM to 6 PM) on a weekday in October 2000. The survey attempted to define the percentage of vehicles that are “through trips” by recording all the license plate numbers of vehicles that pass several locations along the road and then finding how many of the plates matched. The survey was conducted in both directions with recorders on Eureka Road near Auburn-Folsom Road, east and west of Barton Road and near Wellington.

The survey indicated that about 55 percent of the vehicles in the peak (eastbound) travel direction on Eureka Road during the PM commute period traveled the full length of the study section from Wellington to Auburn-Folsom Road. In the non-peak (westbound) direction, about 45 percent of the

vehicles traveled the entire length from Auburn-Folsom Road to Wellington. These observations indicate that a high percentage of traffic using Eureka Road during at least commute hours is through traffic.

A special set of traffic counts were conducted at the entrances to the Eureka Elementary School near the beginning and end of the school day, as well as peak commute hours. These traffic counts are summarized on Figure D-2.

Traffic Speeds

Speed limits in California are based on the measured "85th percentile speed" on a roadway, except for roadway sections that fall under "prima facie" speed limits, such as local residential streets and school zones. The 85th percentile speed represents the speed at which 85 percent of the traffic travels at or less than based on measuring the speed of a statistically significant sample of vehicles. Table D-1 summarizes speed measurements made along Eureka Road as part of this case study. Measurements were made at three locations along Eureka Road during four times of the day (the AM and PM peak traffic hours, near the noon hour and near the time that children leave local elementary schools).

The speed limit on Eureka Road is currently set at 40 mph, except near the Eureka Elementary School where the law sets a 25-mph limit when children are present. Table D-1 indicates that the current 85th percentile speed east of the school is 47 mph; while west of the school it is a very high 57 mph.

Problem Statement

This section of Eureka Road has a high percentage of through traffic, about half the volume during peak periods. The amount of through traffic on this roadway is projected to more than double by 2020. The measured 85th percentile travel speed along Eureka Road exceeds the 40 mph speed limit, with the highest travel speeds (57 mph) measured west of the Eureka Elementary School.

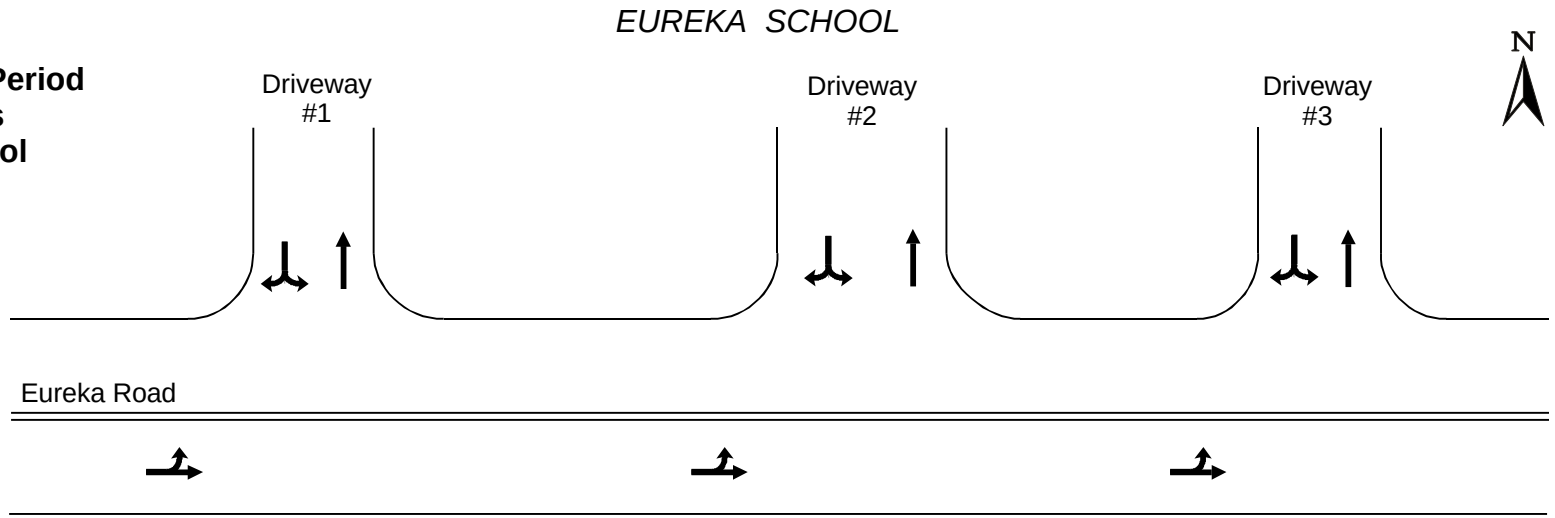
Traffic circulation near the Eureka Elementary School is a problem, especially near the beginning and end of the school day. There is not enough room to store the vehicles of parents waiting to pickup their children at the end of the school day. This is a short period around 3:00 to 3:30, but it causes backups along Eureka Road. The school entrances are all two-way. Many schools use one-way driveways to improve the circulation at the driveways and safety at the drop-off points.

Potential NTM Objectives

While the amount of through traffic on Eureka Road is high and growing, it is classified as an arterial roadway by Placer County and, as such, is intended to carry longer distance trips (through traffic). DKS proposes three realistic objectives for NTM measures:

1) Reduce travel speeds along Eureka Road to 45 mph, with the biggest challenge west of Eureka Elementary School.
2) Improve traffic circulation and safety near the Eureka Elementary School.

Figure D-2
Existing Peak Period Traffic Volumes at Eureka School



	Driveway #1	Driveway #2	Driveway #3
7AM to 8AM	8 7 7 → 277 ← 1 348	1 1 2 → 282 ← 1 348	0 1 5 → 278 ← 6 349
8AM to 9AM	4 3 1 → 206 ← 1 219	38 35 2 → 207 ← 3 182	23 25 52 → 190 ← 135 162
3PM to 4PM	6 7 7 → 276 ← 11 265	39 51 16 → 267 ← 4 237	36 20 34 → 284 ← 100 205
5PM to 6PM	1 0 0 → 359 ← 1 249	4 0 1 → 358 ← 0 244	26 22 32 → 326 ← 24 218

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Table D-1
Measured Travel Speeds on Eureka Road

Location	Time	Vehicles Measured	50th Percentile Speed	85th Percentile Speed	Speed Range	Average Speed
Eureka at Fargo	7-8 am	180	41	46	24-54	41.1
	12-1 pm	208	41	47	31-56	41.6
	3-4 pm	387	42	47	27-57	42.3
	5-6 pm	329	42	47	27-70	42.6
Eureka w/o Barton	7-8 am	201	37	47	27-57	30.3
	12-1 pm	229	42	47	17-57	39.7
	3-4 pm	281	37	47	17-57	38.9
	5-6 pm	236	42	47	17-57	40.6
Eureka w/o School	7-8 am	481	45	57	17-57	47.2
	12-1 pm	180	47	57	17-57	47.2
	3-4 pm	311	52	57	17-57	49.8
	5-6 pm	309	52	57	17-57	50.6

3) Keep traffic volumes to a level that can be accommodated by two travel lanes so that widening Eureka Road to four lanes would not be required.

The Potential Use of Stop Signs on Eureka Road

A number of people who reside along Eureka Road came to the public open houses held for this study. Some of those people want to have stop signs installed at several locations along Eureka Road. Their intent is to slow traffic down and to divert traffic to Douglas Boulevard. The Institute of Transportation Engineers (ITE) has addressed the issues related to the use of stop signs to control traffic speeds and volume in the "Residential Street Design and Traffic Control" (ITE, 1989). The following discussion is based on that document.

The basic purpose of stop signs is to assign right-of-way at intersections. STOP signs are persistently requested by citizens with the expectation that they will control speed or reduce volume in residential neighborhoods. A number of studies have shown, however, that these goals are not always achieved.

Four-way or Three-way stop control is intended primarily where two collector or major streets intersect and where a traffic signal is not yet warranted. It has frequently been used in response to complaints by the public about excessive speeds with indifferent results. The unnecessary stopping of all vehicles adds to noise, fuel consumption, and emission of air pollutants-carbon monoxide, hydrocarbons, and oxides of nitrogen.

Numerous studies have been prepared regarding the degree to which stop signs are obeyed. Generally, when not required to stop for cross traffic, only 5 to 20 percent of all drivers will come to a complete stop, 40 to 60 percent will come to a "rolling" stop below 5 mph and 20 to 40 percent will pass through at higher speeds. Signs places on major and collector streets for the purpose of speed

reduction are the most flagrantly violated. Thus, stop signs which do not meet the standard warrants tend to some extent to be ignored by drivers, whereas signs placed for right-of-way purposes are more likely to be obeyed.

- **Effect on Traffic Volume.** Where local streets offer significant savings in time over congested parallel major and collector routes or allow avoidance of congestion points, stop signs will do little to reduce traffic volume. But when the local street offers marginal travel time advantage over other routes, the time lost at stop signs may be enough to shift traffic.

- **Effect on Traffic Speed.** Requests from citizens for installation of stop signs are usually related to the desire for speed control. The general conclusion from numerous studies on effectiveness of stop signs as a speed control measure is that they have little overall effect on speed, except within approximately 200 feet of the intersection controlled. They are almost universally reported to have little or no effectiveness in controlling mean or 85th percentile speeds at midblock. A possible reason why resident beliefs about the speed control effectiveness of stop signs is contrary to the finding of engineering studies is that there is some evidence that stop signs do reduce the midblock speed of the fastest vehicles in the traffic stream. It is probably these fastest vehicles, rather than those traveling at the median or 85th percentile speed, that disturb residents. Elimination of extreme speeding by the few very fastest vehicles could satisfy the residents' concerns without altering the 85th percentile or median speeds at all. Another reason why neighbors may feel stop signs to be an effective speed control device is that they perceive traffic slowing down and stopping at controlled intersections a real benefit, regardless of what effect the signs have on midblock speeds. Pedestrians are trained to cross at intersections; so a measure which reduces speeds and creates gaps in the vehicle stream can logically be thought practical. Hence, engineering studies which have found stop signs ineffective for residential area speed control may have considered an irrelevant data base.

- **Effect on Traffic, Noise, Air Quality, and Energy Consumption.** Stop signs tend to increase noise in the vicinity of an intersection by adding acceleration and braking noise. Deceleration, idling, and acceleration increase air pollutant emissions and fuel consumption; carbon monoxide, in particular, has an adverse impact on the immediate vicinity of its emission.

- **Effect on Traffic Safety.** The traditional traffic engineering belief is that stop signs not warranted by traffic volume conflicts or specific site safety conditions (such as inadequate sight distance) would tend to increase traffic accidents by inducing either a general disregard for stop signs in the community or a hazardous disregard for the specific "unwarranted" sign. Effects of an unwarranted stop signs on driver behavior and safety at stop signs throughout the community are difficult to substantiate. Evidence to date on the safety effects of individual stop signs placed for volume and speed reduction purposes is mixed. It is difficult to assess reasons for these results of why the common traffic engineering belief is not more convincingly supported in the empirical data. At some of the intersections where safety decrements were measured, placement of the signs in poor visibility positions and lack of supplementary markings may account for the accident experience rather than fundamental characteristics related to the warrants. Cases where safety experience was reportedly

improved may include instances where traditional warrants for stop sign installation were actually met. Further, cases which reported safety improvements may include intersections with conditions border lining traditional warrants.

- **Uniform Standards and Warrants.** Stop sign design details and warrants for installation are included in the MUTCD. However, the warrants relate to right-of-way assignment and response to site safety conditions; the MUTCD specifically advises that stop sign should not be used for purposes of speed control.

- **Community Reaction.** Stop signs have a very positive image with many residents, who often see them as a solution to "near miss" as well as actual accident problems. They are also viewed as being effective at controlling speed. Negative reactions to stop signs come mainly from residents near the intersections who are subjected to additional noise from stopping and accelerating vehicles, and from motorists who think they are being stopped needlessly.

Other Potential Solutions

Section 6 of this report outlines the "NTM Toolbox", which list a set of measures that are appropriate for dealing with neighborhood traffic issues. It clearly states that most NTM measures are appropriate for local roadways, and only a few are appropriate for arterial roadways such as Eureka Road.

Based on the technical analysis and best practices for NTM planning and traffic engineering, the following solutions could be pursued to meet the NTM objectives stated above:

- Add shoulder/bike lanes along Eureka Road, but keep travel lanes narrow (10 feet) and provide 5 to 6 foot for the shoulder/bike lanes. This design will help to keep speeds down even with a wider paved cross-section. This would result in 30 to 32 feet of pavement along most of Eureka Road. Currently the pavement width along Eureka Road varies, but much of it has 25 to 26 feet of pavement. Thus the recommended cross-section would be 5 to 7 feet wider than today.

- Conduct a special design study for the segment of Eureka Road near the Eureka Elementary School. The intent of this design is to promote slower speeds and improve circulation at the school entrances.

- The special design study should engage the school district since it would be desirable to modify the driveways and interior parking/aisle layout at the school to improve circulation onto and off of Eureka Road, and provide more short-term storage of vehicles. The use of one-way driveways should be considered. Unfortunately, there will be some cost to the changes in the school's access and parking.

- At the beginning of the 25 mph school speed zone, the appearance/character of Eureka Road should change. The "entrances" to the school zone should appear somewhat narrower to the motorist to establish a slower feel to the roadway. This could be accomplished by using a raised median and selected planting and signage. The median could help channelize the turning movements at the school and other local roadways and thus improve circulation

during peak hours. The precise design of the improvements along Eureka Road near the school will depend on whether the school driveways are converted to one-way operations and/or moved.

- Widening this 2.5-mile long section of Eureka Road to add shoulder/bike lanes will be costly and may need to be phased. It would be desirable to test the effectiveness of measures to reduce travel speeds before they are implemented for this entire section of roadway. A demonstration project along the western segment of Eureka Road, between the Eureka Elementary School and Wellington, where the travel speeds are the highest should be considered. This section would connect existing bike lanes along Wellington to the elementary school.

- The use of a "roundabout" (instead of a traffic signal) should be considered at the intersection of Eureka Road and Barton Road. Roundabouts are extensively used in Europe and are gaining popularity in the U.S. A roundabout reduces travel speeds in its vicinity and reduces delays at an intersection compared to a four-way stop.

If speeds can be reduced modestly along Eureka Road, then traffic diversions from Douglas Boulevard would be lowered somewhat. However, there will still be traffic growth on Eureka Road over the next 20 years. The study recommendations call for maintaining two travel lanes on Eureka Road but preserving right-of-way for a possible widening to four lanes if needed in the long-term future. A widening to four lanes would defeat the NTM measures outlined above and change the character of this roadway. It is unknown if there will need to be additional travel lanes on Douglas Boulevard and/or Eureka Road in the long-range future. To preserve the character of Eureka Road as long as possible, the County could consider a policy that would call for Douglas Boulevard to be widened to 6 lanes before a widening of Eureka is considered.

Elmhurst Drive

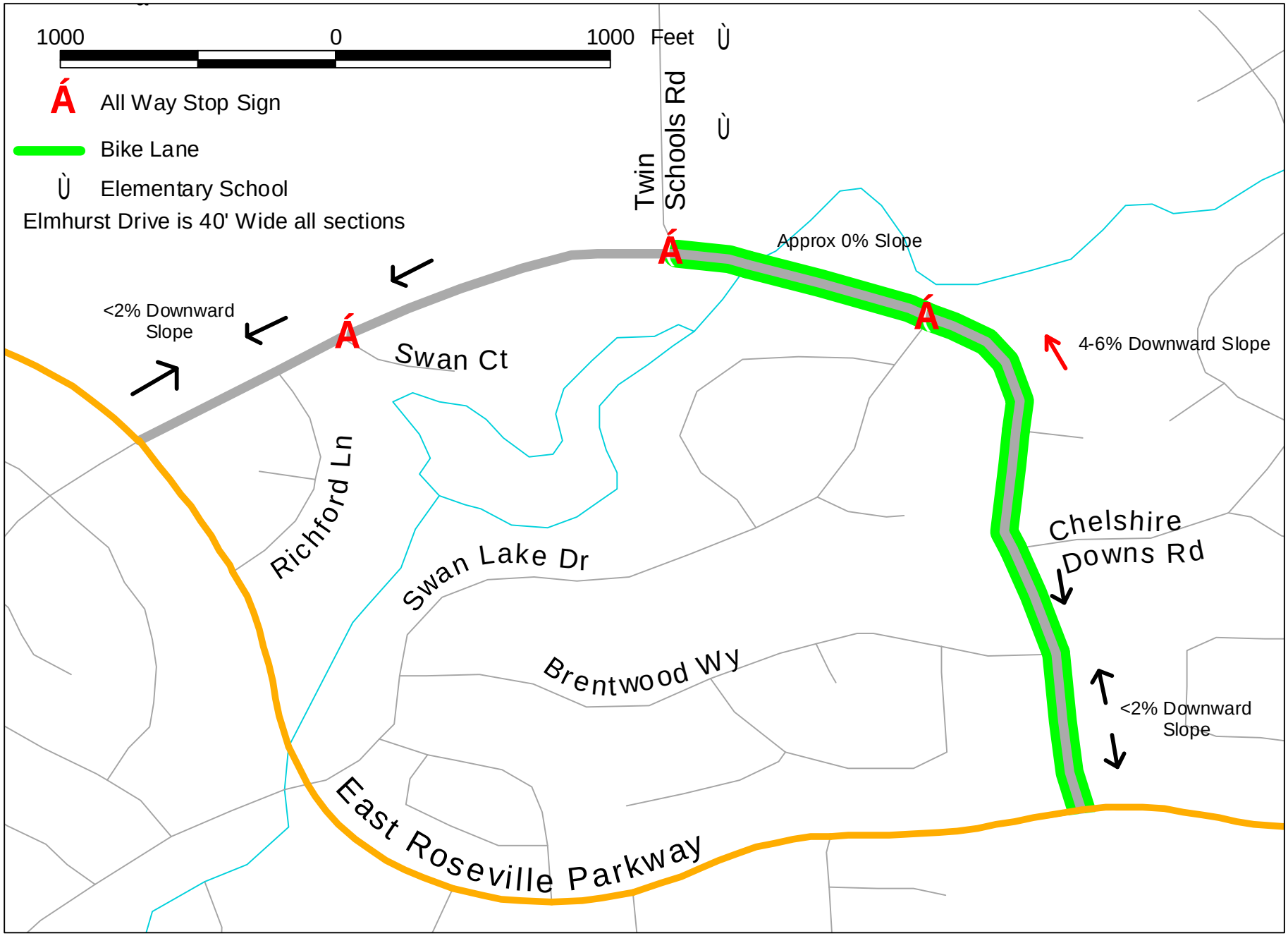
Elmhurst Drive is a "loop" roadway that extends from East Roseville Parkway at Treelake Road to East Roseville Parkway at Chessington Court. It is classified as a local roadway in the Placer County General Plan. Figure D-3 shows some of the relevant information about this section of roadway.

Roadway Geometry and Traffic Control

This 0.8 mile long roadway has two travel lanes and is 40 feet wide curb to curb. There are sidewalks on both sides of the street. There is a relatively long hill at a 4 to 6 percent grade between Swan Lake Drive and Chelshire Downs Road. There are several segments of Elmhurst that have modest grades of 1 to 2 percent (see Figure D-3).

East of Twin School Road, the travel lanes and on-street parking areas are separated by a painted white line and a yellow center stripe is used for a short segment near the crest of the hill near Chelshire Downs Road. There is a yellow center stripe between Twin School Road and Swan Court but there are no white lines between the on-street parking areas and the travel lanes.

Figure D-3: Elmhurst Drive NTM Case Study Area



On either end of Elmhurst Drive, its intersections with East Roseville Parkway are controlled with four-way stop signs. There are three intersections along Elmhurst Drive with three-way stop sign control: Swan Court, Twin School Road and Swan Lake Drive.

Existing and Future Traffic Volumes

Elmhurst Drive currently carries 800 daily vehicle trips near Chelshire Downs Road. This roadway is not included as a separate "link" in the Placer County Travel Demand model which focuses on arterial and collector roadways. While traffic volumes are expected to increase on Elmhurst Drive due to some vacant land on Elmhurst or its tributaries, increases in traffic volumes over the next 20 years should not be substantial.

Traffic counts were conducted during peak periods at the intersection of Elmhurst and Twin Schools Road, which are summarized on Figure D-4.

Traffic Speeds

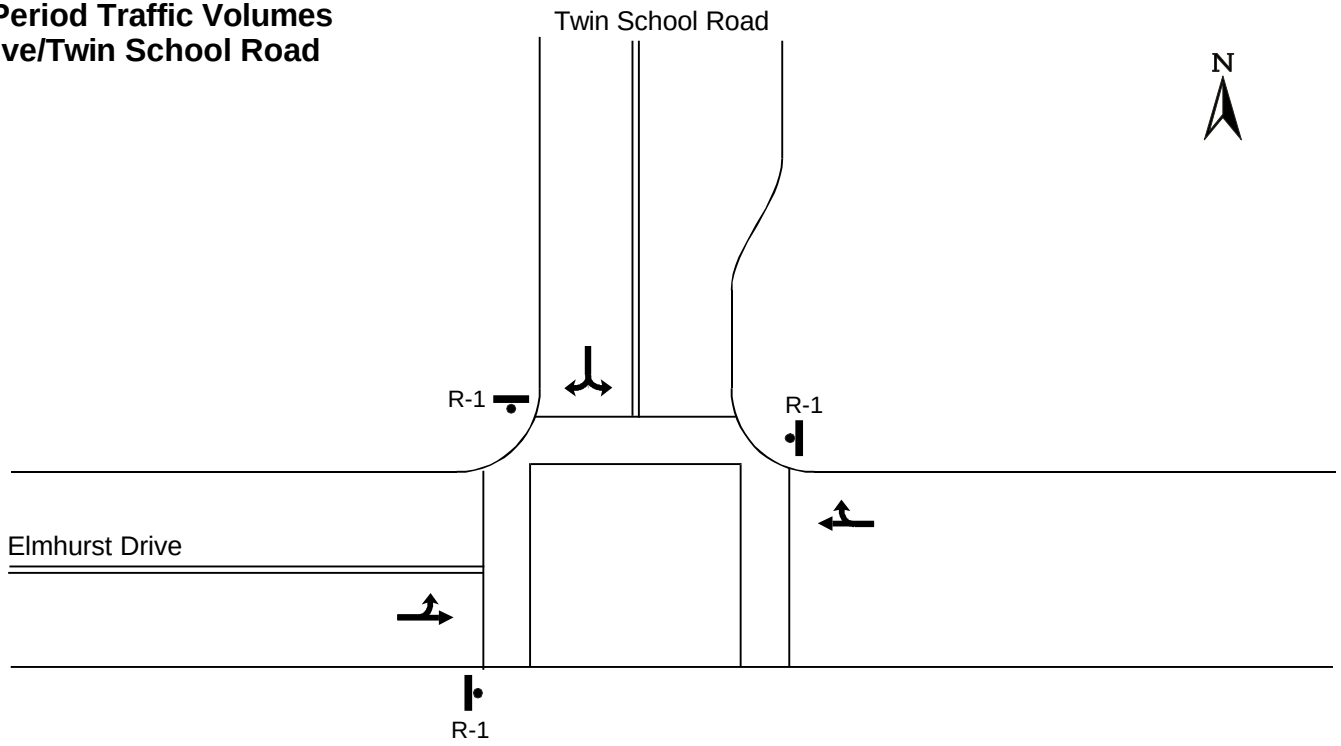
Speed limits in California are based on the measured "85th percentile speed" on a roadway, except for roadway sections that fall under "prima facie" speed limits, such as local residential streets and school zones. The 85th percentile speed represents the speed at which 85 percent of the traffic travels at or less than based on measuring the speed of a statistically significant sample of vehicles. Table D-2 summarizes speed measurements made along Elmhurst Drive as part of this case study. Measurements were made at two locations along Elmhurst Drive during four times of the day (the AM and PM peak traffic hours, near the noon hour and near the time that children leave local elementary schools).

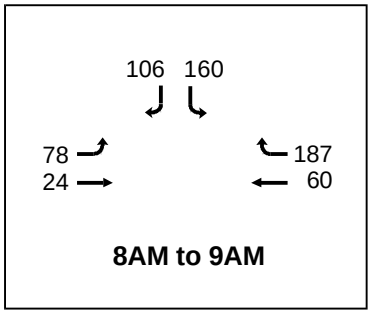
Table D-2
Measured Travel Speeds on Elmhurst Drive

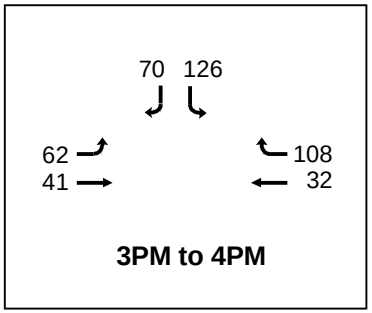
Location	Time	Vehicles Measured	50th Percentile Speed	85th Percentile Speed	Speed Range	Average Speed
Elmhurst n/o Swan Court	7-8 am	153	27	32	17-42	27.9
	12-1 pm	101	32	32	19-37	29.1
	3-4 pm	206	32	32	22-423	29.7
	5-6 pm	141	32	32	22-42	30.7
Elmhurst n/o High Grove	7-8 am	171	27	31	20-40	26.8
	12-1 pm	70	27	30	20-31	26.6
	3-4 pm	219	25	29	20-37	25.5
	5-6 pm	99	29	33	22-36	28.7

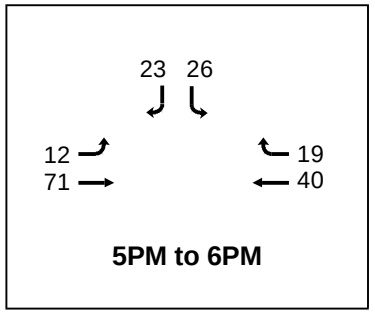
The speed limit on Elmhurst Drive is set at 25 mph, in character with a local residential street. Table D-2 indicates that the current 85th percentile speed is 32 mph between Swan court and Twin School Road and ranges from 29 mph to 33 mph between Swan Lake Drive and High Grove Court.

Figure D-4
Existing Peak Period Traffic Volumes
at Elmhurst Drive/Twin School Road









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Problem Statement

The 85th percentile traffic speeds along Elmhurst Drive exceed the 25 mph speed limit. In fact the 85th percentile speeds of 32 to 33 mph are at a level that are clearly flagged as a problem under NTM programs in other cities and counties.

A review of the peak period traffic counts conducted at the intersection of Elmhurst and Twin Schools Road does not indicate that there is any significant amount of "cut through" traffic using Elmhurst Drive to avoid East Roseville Parkway as suggested by some local residents.

Potential NTM Objectives

DKS proposes that a realistic objective of the NTM measures on Elmhurst drive would be to reduce its 85th percentile speed to 27 mph or less.

Potential Solutions

The 40-foot width of this roadway with a limited number of parked vehicles encourages higher than desirable speeds. Reconstructing the roadway to a narrower cross-section would help reduce speeds, but would be expensive. Striping the roadway to provide white lines between the on-street parking areas and the travel lanes along its entire length would have little impact unless the travel lanes are made narrower than those currently provided east of Twin Schools Road.

One option would be to provide a stop sign on Elmhurst Dive at Chelshire Downs Road. This stop sign would have a limited reduction in travel speeds near this intersection, but would not reduce speeds west of Twin Schools Road, where speeds are above 32 mph.

Another option is to install speed humps (see Appendix C for a description of this measure) on two candidate segments of Elmhurst Drive: between Chelshire Downs Road and Brentwood Way and between Swan Court and Twin School Road. Speed humps would help reduce speeds in these areas. However, speed humps have drawbacks, including impacts on emergency services and maintenance. The County has never installed any speed humps and is concerned about their use. Most communities that allow speed humps require that a majority of the residents on a street vote for their use before they are installed.

Appendix E. Recommended Capital Improvement Program

This Appendix presents a recommended 2020 Capital Improvement Program (CIP) to reflect the recommendations the Southeast Placer County Transportation Study. The CIP covers the following categories of improvements:

- Roadway widening or extensions to provide additional traffic capacity
- Roadway widening to provide shoulders or shoulder/bike lanes
- Improvements to major intersections to provide additional traffic capacity
- New traffic signals

The recommended improvements, shown in Table E-1, were based on traffic volume projections for 2020. Thus these roadway improvements would be implemented over the next 20 years based on a monitoring of traffic growth and on available funding. Projects under each of the four improvement categories are discussed in the following sections.

Roadway Capacity Widening and Extensions

The Southeast Placer County Transportation Study recommended that the following roadways be widened:

- Auburn-Folsom Road from two lanes to four lanes between the Sacramento County Line and 500 feet north of Douglas Boulevard
- Douglas Boulevard from four lanes to six lanes between Cavitt Stallman Road and Sierra College Boulevard.

The study also recommended that a new two-lane connector roadway be constructed between Laird Road and Val Verdi Road as part of implementing a "functional equivalent" for the Rocklin Road Extension.

The study assumed that the following key roadway improvements would be implemented by 2020:

- Sierra College Boulevard widened from two lanes to six lanes between the Sacramento County line and Old Auburn Road.
- Sierra College Boulevard widened from four lanes to six lanes between Old Auburn Road and Olympus Drive**.**
- Sierra College Boulevard widened from two lanes to six lanes between Rocklin Road and I-80.
- Eureka Road widened from two to four lanes from Wellington Way to Sierra College Boulevard

Table E-1
Recommended Capital Improvement Program for Southeast Placer County

Location	Improvement	Length (miles)	Planning Level Cost Estimate[3] (2000 $)
Roadway Capacity Widening and Extensions			
Auburn-Folsom Rd. (Sac Co Line to 500 ft north of Douglas)	Widen from 2 to 4 lanes with Class II bike lanes	2.24	$6,000,000
Douglas Boulevard (Cavitt Stallman Rd. to Sierra College Blvd.)	Widen from 2 to 6 lanes with Class II bike lanes	0.25	$500,000
Sierra College Boulevard (Sacramento Co. Line to Old Auburn)[1]	Widen from 2 to 6 lanes with Class II bike lanes	0.31	$675,000
Sierra College Boulevard (Old Auburn Rd to Roseville Parkway)[2]	Complete widening to 6 lanes with Class II bike lanes	0.55	$440,000
Sierra College Boulevard (Eureka Road to Douglas Blvd)[2]	Complete widening to 6 lanes with Class II bike lanes	0.46	$368,000
Sierra College Boulevard (Douglas Blvd to Cavitt Stallman)[2]	Widen from 4 to 6 lanes with Class II bike lanes	0.27	$378,000
Sierra College Boulevard (Rocklin Road to I-80)[3]	Widen from 2 to 4 lanes with Class II bike lanes	0.84	$1,764,000
Eureka Road (Wellington to Sierra College Blvd.)	Widen from 2 to 4 lanes with Class II bike lanes	0.12	$252,000
Old Auburn Road (West of Sierra College to City of Roseville)	Complete north side of roadway.	0.48	$192,000
Connector between Laird Rd. and Val Verdi Rd.	New two-lane roadway with shoulders	0.25	$400,000
Widening for Shoulders (or Shoulders/Bike Lanes)			
Eureka Rd. (Auburn-Folsom Rd. to Wellington)	Widen from 25 ft. to 32 ft. of pavement	2.44	$1,488,400
Olive Ranch Rd. (Cavitt Stallman Rd.to Barton Rd)	Widen from 25 ft. to 28 ft. of pavement	1.71	$666,900
Cavitt Stallman Rd. (Cavitt Stallman So. Rd. to Auburn-Folsom)	Widen from 25 ft. to 28 ft. of pavement	4.30	$1,677,000
Horseshoe Bar Rd. (Loomis Town Limit to Auburn-Folsom Rd.)	Widen from 22 ft. to 32 ft. of pavement	3.10	$2,387,000
King Rd. (Loomis Town Limit to Auburn-Folsom Rd.)	Widen from 22-24 ft. to 32 ft. of pavement	2.63	$2,025,100
Dick Cook Rd. (Val Verdi Rd. to Auburn-Folsom Rd.)	Widen from 18 ft. to 28 ft. of pavement	1.58	$1,200,800
Wells (Laird to Loomis Town Limit)	Widen from 21 ft. to 30 ft. of pavement	0.60	$480,000
Barton Rd. (Sacramento Co Line to Loomis Town Line)	Widen from 23-28 ft. to 36 ft. of pavement	4.44	$4,440,000
Laird Rd. (Cavitt Stallman to Loomis Town Line)	Widen from 22-23 ft. to 32 ft. of pavement	2.02	$1,555,400
Val Verde Rd. (Wells to King Rd.)	Widen from 22-28 ft. to 30 ft. of pavement	2.77	$1,523,500
Penryn Rd. (King to Boulder Creek)	Widen from 21 ft. to 32 ft. of pavement	0.50	$500,000
Shirland Tract Rd. (Auburn-Folsom to City of Auburn)	Widen from 21 ft. to 28 ft. of pavement	2.10	$1,260,000
Auburn-Folsom Road (Douglas to Joe Rodgers)	Widen for better bike lanes	0.49	$147,000
Auburn-Folsom Road (Shirland Tract Rd. to City of Auburn)	Widen for better bike lanes	0.73	$219,000

Table E-1
Recommended Capital Improvement Program for Southeast Placer County

Location	Improvement	Length (miles)	Planning Level Cost Estimate[3] (2000 $)
Intersection Capacity Improvements			
Douglas Blvd. and Sierra College Blvd.	Additional turn lanes		$500,000
Douglas Blvd. and Barton Rd.	Additional turn lanes		$100,000
Douglas Blvd. and Auburn-Folsom Rd.	Additional turn lanes		$300,000
Eureka Rd. and Barton Rd.	Additional turn lanes or traffic circle		$400,000
Eureka Rd. and Auburn-Folsom Rd.	Additional turn lanes		$100,000
Traffic Signal Improvements			
Eureka Rd. and Barton Rd.	New Signal		$300,000
Eureka Rd. and Wellington Way	New Signal		$250,000
East Roseville Pkwy and Wellington Way	New Signal		$250,000
Douglas Blvd and Joe Rodgers	New Signal		$250,000
Douglas Blvd and Berg	New Signal		$250,000
Douglas Blvd and Quail Oaks	New Signal		$250,000
King Rd. and Penryn Rd.	New Signal		$250,000
Penryn Rd and I-80/Boulder Creek	New Signal		$300,000
Barton Rd. and East Roseville Pkwy.	New Signal		$250,000
Auburn-Folsom Rd. and Fuller	New Signal		$250,000
Auburn-Folsom Rd. and Cavitt Stallman Rd./Laird Rd	New Signal		$250,000
Auburn-Folsom Rd. and Horseshoe Bar	New Signal		$250,000
Auburn-Folsom Rd. and King Rd.	New Signal		$250,000
	Total Estimated Cost of CIP Improvements		$35,289,100

[1]Cost relects Placer County's portion of project with Sacramento County to widen Hazel and Sierra College that ends south of Old Auburn Road

[2]Costs do not reflect portions of improvements that will be provided by City of Roseville

[3]Costs do not reflect portions of improvements that will be provided by City of Rocklin

[4]Cost of shoulder improvements include overlay of existing pavement

All of these roadway improvements are included in the recommended CIP.

Widening for Shoulders

The Southeast Placer County Transportation Study recommended cross-section standards for two-lane roadways that vary by traffic volume, travel speed and whether the roadway has a designated on-street Class II bike lane. Shoulders 2 to 3 feet wide are recommended on roadways with less than 2,000 daily vehicles. Improvements should be made when development occurs along those low volume roadways. However, most of the shoulder improvements in the recommended CIP are on roadways that are projected to have traffic volumes greater than 2,000 daily vehicles, particularly those roadways that have planned bike lanes. Table E-2 shows a generalized analysis of shoulder improvement needs on two-lane roadways in Southeast Placer County.

Intersection Capacity Improvements

The capacity of the roadways in Southeast Placer County is dictated by its major intersections and the study found that if aggressive improvements are made to key intersections, the County could get close to meeting its LOS "C" standard. Such aggressive improvements would include dual left-turn lanes at selected locations and separate right-turn lanes on a number of approaches. Therefore, the study recommended that additional turn lanes, and in some cases additional through lanes, be added to one or more approaches at the following intersections:

- Douglas Blvd. and Sierra College Blvd.
- Douglas Blvd. and Barton Rd.
- Douglas Blvd. and Auburn-Folsom Rd.
- Eureka Rd. and Barton Rd.
- Eureka Rd. and Auburn-Folsom Rd.

Traffic Signal Improvements

A planning level traffic signal warrant analysis was conducted at all the major unsignalized intersections in Southeast Placer County based on existing and 2020 traffic volumes. This planning level analysis, shown in Table E-3, does not provide a definitive "yes" or "no" determinant for the need for a traffic signal over the next 20 years. It is viewed as a screening analysis that (when coupled with an analysis of existing traffic flows, potential development areas and professional judgment) helped arrive at an appropriate list of potential traffic signal needs that is incorporated into Table E-1.

Cost Estimates

Planning level cost estimates were prepared for each of the projects in the CIP. These estimates, shown in Table E-1, reflect generalized per mile unit cost estimates and should be refined based on preliminary engineering for each project on the CIP list. The planning level cost estimates indicate that the CIP would require about $35 million in year 2000 dollars to implement.

Table E-2
Analysis of Shoulder Improvements Needs on Two-Lane Rural Roads
Southeast Placer County

Roadway	Segment	Daily Traffic Volume		Shoulders Recommended: Daily Traffic Volume Exceeds 2,000 ADT		Shoulders Recommended: Planned Bikeway (Class II or III)
		Existing	2020	Existing	2020	
Eureka Road	Wellington Way to Barton Rd.	4,237	12,100	X	X	II
	Barton Rd. to Auburn-Folsom Rd.	4,892	12,400	X	X	II
Olive Ranch Road	Cavitt Stallman Rd. to Berg	2,208	4,400	X	X	III
	Berg to Barton Rd.	1,737	2,400		X	III
Joe Rodgers Road	Douglas to Auburn-Folsom Rd.	1,432	1,800			III
Cavitt-Stallman Road	Cavitt Stallman So. to Olive Ranch Rd.	4,741	12,900	X	X	
	Olive Ranch Rd. to Barton Rd.	550	6,300		X	
	Barton Rd. to Laird Rd.	1,200	4,900		X	
	Laird Rd. to Auburn-Folsom Rd.	3,140	11,100	X	X	
Wells Avenue	Loomis Town Line to Laird Rd.	1,174	1,200			II
	Laird Rd. to Val Verde Rd.	900	1,500			II
Dick Cook Road	Val Verde Rd. to Auburn-Folsom Rd.	442	1,300			
Horseshoe Bar Road	Loomis Town Line to Val Verde Rd.	3,290	3,000	X	X	II
	Val Verde Rd. to Auburn-Folsom Rd.	2,700	3,500	X	X	II
	Auburn Folsom Rd. to Folsom Lake	1,336	1,500			II
King Road	Loomis Town Line to Penryn Rd.	3,279	7,800	X	X	II
	Penryn Rd. to Val Verdi Rd.		8,500		X	II
	Val Verde Rd. to Brennans Rd.	3,592	4,300	X	X	II
	Brennans Rd. to Auburn-Folsom Rd.		3,700		X	III
Rock Springs	I-80 to Brennans Rd.	601	500			III
	Brennans Rd. to Auburn-Folsom Rd.	216	300			III
Gilardi Rd	I-80 to Newcastle Rd.	512	1,200			

Table E-2
Analysis of Shoulder Improvements Needs on Two-Lane Rural Roads
Southeast Placer County

Roadway	Segment	Daily Traffic Volume		Shoulders Recommended: Daily Traffic Volume Exceeds 2,000 ADT		Shoulders Recommended: Planned Bikeway (Class II or III)
		Existing	2020	Existing	2020	
Newcastle Road	Powerhouse Rd. to Brennans Rd.		1,600			
	Brennans Rd. to Auburn-Folsom Rd.	566	1,200			
	Auburn Folsom Rd. to Rattlesnake Bar Rd.		400			
Powerhouse Road	Newcastle Rd. to Auburn-Folsom Rd.	584	1,200			
Indian Hill Road	Newcastle Rd. to Auburn City Limits	6,175	10,700	X	X	
Barton Road	Sacramento Co Line to E. Roseville Pkwy	2,395	14,500	X	X	II
	East Roseville Prkwy to Eureka Rd.	2,800	12,800	X	X	II
	Eureka Rd. to Douglas	4,665	10,400	X	X	II
	Douglas to Olive Ranch Rd.	3,000	10,500	X	X	
	Olive Ranch Rd. to Cavitt Stallman Rd.	4,665	10,200	X	X	
	Cavitt Stallman Rd. to Loomis Town Line	3,000	13,100	X	X	
Berg Street	Douglas to Olive Ranch Rd.	926	400			
Laird Road	Cavitt Stallman Rd. to Wells Rd.	2,528	7,200	X	X	III
	Wells Rd. to Loomis Town Line	2,111	5,500	X	X	III
Val Verde Road	Wells Rd. to Dick Cook Rd.	923	1,300			III
	Dick Cook Rd. to Horseshoe Bar Rd.	1,032	2,300		X	III
	Horseshoe Bar Rd. to King Rd.	1,438	3,300		X	III
Penryn Road	King to I-80/Boulder Creek	3,200	6,800	X	X	III
Brennans	King Rd. to Rock Springs Rd.	1,204	900			
	Rock Springs Rd. to Newcastle Rd.	494	700			
Rattlesnake Road	Folsom Lake to Newcastle Rd.		600			III
	Newcastle Rd. to Shirland Tract Rd.	445	500			III
Shirland Tract Road	Auburn-Folsom Rd. to City of Auburn	413	1,200			III

Table E-3
Planning Level Traffic Signal Warrant Analysis for Southeast Placer County

Main Street	Daily Traffic Volume		Minor Street	Daily Traffic Volume		Signal Warrants Likely Met	
	Existing	2020		Existing	2020	Existing	2020
Eureka Road	5,000	12,300	Barton Rd.	4,100	13,100		X
	5,900	12,400	Wellington Way	1,500	3,000		X
East Roseville Prkwy	9,900	13,400	Wellington Way	1,500	3,000		X
Douglas Blvd.	30,000	32,500	Quail Oaks Dr.				
	29,500	32,800	Berg St.	900	1,100		
	19,200	32,500	Joe Rodgers Rd.	2,000	2,400	X	X
Olive Ranch Rd	2,000	3,400	Berg Rd.	1,000	1,500		
Cavitt Stallman Rd	3,200	13,400	Cavitt Stallman South Rd.		6,500		X
	1,800	9,200	Olive Ranch Rd.	2,200	4,400		X
	2,400	7,500	Laird Rd.	2,500	7,200		X
Wells Ave.	1,000	1,500	Val Verdi Rd.	900	1,300		
Horseshoe Bar Rd.	3,000	3,300	Val Verdi Rd.	1,400	3,300		
King Rd.	3,300	8,200	Penryn Rd.	3,200	6,800		X
	3,500	6,400	Val Verdi Rd.	1,400	3,300		
	3,500	4,000	Brennans Rd.	1,200	1,200		
Newcastle Rd.	2,600	2,900	Powerhouse Rd.	600	1,200		
	1,000	1,400	Brennans Rd.	500	700		
Penryn Rd.			Boulder Creek/I-80				
Sierra College Blvd.	9,500	27,000	Cavitt Stallman Rd.	3,800	13,900		X
Barton Rd.	3,000	14,200	East Roseville Prkwy	4,500	6,500		X
	3,000	10,400	Olive Ranch Rd.	1,800	2,400		X
	4,700	11,600	Cavitt Stallman Rd.	1,200	5,200		X
Auburn-Folsom Rd.	10,100	15,600	Joe Rodgers Rd.	1,400	1,800		
	7,700	12,800	Cavitt Stallman Rd/Laird Rd.	3,100	11,100		X
	5,400	10,100	Dick Cook Rd.	600	1,300		
	5,200	9,600	Horseshoe Bar Rd.	2,200	3,500		X
	5,300	9,700	King Rd.	3,500	3,700		X
	5,700	9,800	Newcastle Rd.	500	1,200		
	5,700	9,400	Shirland Tract Rd.	300	1,200		
Laird Rd.	2,300	6,300	Wells Ave.	1,200	1,500		
Val Verdi Rd.	1,000	1,800	Dick Cook Rd.	600	1,300		
Brennans Rd.	800	800	Rock Springs Rd.	600	600		

Note: Signal Warrants are based on "urban criteria" along Sierra College Blvd. and along and south of Douglas Blvd. "Rural criteria" were used north of Douglas Blvd.